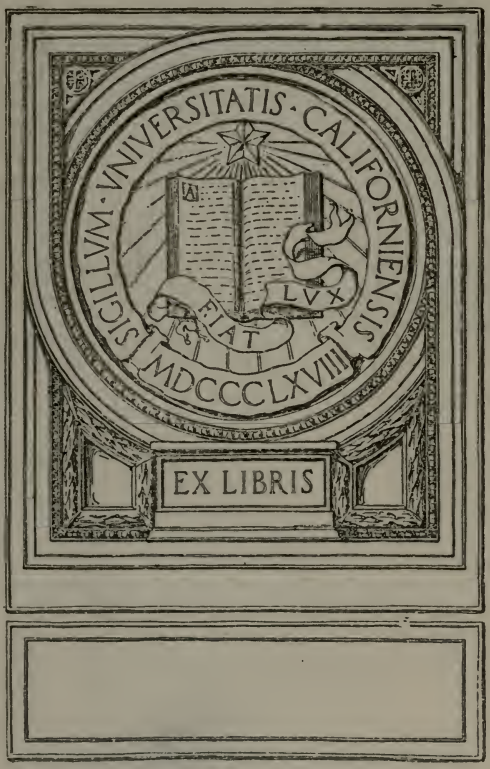
TOWARDS RACIAL HEALTH

Norah H. March, B.Sc., M.R.San.I.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TOWARDS RACIAL HEALTH

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A HANDBOOK ON THE TRAINING OF BOYS AND GIRLS, PARENTS, TEACHERS & SOCIAL WORKERS

BY

NORAH H, MARCH, B.Sc., M.R.San.I.

WITH A FOREWORD BY

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NEW AMERICAN EDITION

with an Introduction by

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AUTHOR'S NOTE

My sincere thanks are due to Major Leonard Darwin, President of the Eugenics Education Society, for reading and discussing with me the two chapters on Education for Parenthood, to Dr. Stanley Hall for permission to quote at length from his book, *Aspects of Child Life and Education*, to Mr. and Mrs. Whetham for permission to reproduce a chart from their valuable book, *The Family and the Nation*, and to Miss Lawson for the interest and care she has taken in the illustration of this book. To Dr. O. V. Darbishire and to Mr. B. D. Lawson I am indebted for some notes on Seaweeds.

Parts of the manuscript dealing with the more purely medical aspects of the work have been read by several distinguished members of the medical profession; to these I take this opportunity of expressing my thanks for giving me the benefit of their authoritative opinion. In particular, my gratitude is due to Dr. Eric Pritchard, who read and considered a large part of the manuscript, Chapters II.–V. In other ways, too, I am indebted to several members of the medical profession for help they have from time to time so generously given me.

To gather together the facts concerning this many-faceted subject has entailed much reading of many

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authors. Some of these are mentioned in the Bibliography, others whose works are of a more advanced or specific nature are not included in that list of books, but to all I am grateful. Finally, my profound thanks are due to Dr. C. W. Saleeby for his kindness and support in reading the proofs and for several valuable comments and suggestions, and to Professor J. Arthur Thomson for doing me the honour of contributing the Foreword.

N. M.

FOREWORD

By J. ARTHUR THOMSON

I FEEL it a privilege to write a short introduction to Miss March's excellent book. It is a piece of work that was needed and for which many will be grateful. We give instruction to young people in regard to food and exercise, but 'sex' we scarcely mention. This cannot be because it is too sacred, for we give religious instruction; nor because it is something to be ashamed of, for we know that it is the physical basis of what may be the finest thing in life; nor because the conspiracy of silence is working well, for it is not. The reason why we do not face up to our duty in the way of sex education and education for parenthood is that the task is so difficult, and hence our welcome to Miss March's book. For she writes with the convictions won by a wide experience as a teacher, and with the scientific competence gained by studying the subject for many years in all its aspects. What is prominent is the equal emphasis which she lays on the biological approach to sex instruction and on the ethical note which must be sounded sympathetically when personal relations are approached. The absence of platitudinarian talk and the firmness of her treatment of the facts of the

case will meet with the approval of all discerning readers. Miss March does not propose any doctrinaire scheme, but she offers suggestions which can be adapted to different circumstances, for it seems to be clear that education in racial hygiene must be graduated and differentiated by the teacher's discretion. One reason for this is that the subject is still in an experimental stage, and another is that we have not yet sufficiently consulted the child. We have not been humble enough and scientific enough to go far as yet in finding out what the person most concerned thinks about it all. But towards this also Miss March has made a notable contribution. I have pleasure in recommending to the unprejudiced her wise and sympathetic study.

J. A. T.

University of Aberdeen.

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INTRODUCTION TO THE AMERICAN EDITION

By Evangeline W. Young, M. D.

One of the most urgent needs in the educational system of this country is for the right kind of eugenic instruction for young people. Parents, teachers and social workers are realizing more and more that the attitude of the past in ignoring or dealing casually with this subject has been wholly inadequate either as a protection from social dangers or as a preparation for parenthood.

It is a startling as well as a significant fact that it has taken nothing short of a world war to make us realize how serious has been our shortcoming in this respect. Statistics made in connection with the Army Draft of 1917 brought to light appalling facts regarding the physical condition and morals of the young men of this nation. While war conditions served to bring these facts to our attention, we must remember that war itself was not responsible for them to any great degree. This deplorable state existed before the war, and it is we, who have had the responsibility of instructing our young people, who are largely to blame.

Now that the fighting is over, these conditions still exist, and are encouraged and fostered by organized interests whose business it is to profit from every form of social evil. It is high time for parents and all who are coming into close contact

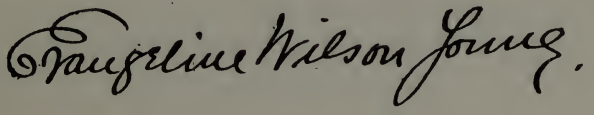
with young people to open their eyes and to employ every possible means to counteract these evil influences.

Parents have too long been unconscious of the low tone which has pervaded the literature, drama, films and music of the past decade, and have failed to sense the social dangers accompanying the introduction of pagan forms of dancing. The business interests which sell various forms of amusement to young people know exactly how to use this material to their own best advantage. The resulting sexual ideals and habits of boys and girls are in many instances disastrous. The social worker who struggles with the problems of juvenile crime sees that by far the greater number of tragedies during this period are due to the fact that youth has not been sufficiently fortified against these evil influences.

It is the parent's problem and sacred duty to win and keep the confidence of the child from earliest infancy. This confidence is especially necessary in regard to all matters pertaining to sex, as otherwise a distorted and harmful interpretation is received from other sources. It is here that this book will be found invaluable. If parents wish to offset the corrupting influences which are everywhere about the child of today, they must be willing to take the time necessary for preparing and giving such instruction early in life. Miss March has studied and understands children, and appreciates the necessity of adapting one's instruction to the individual child. Many an unprepared parent will find this book of the greatest help in meeting her own problems and in finding the best methods of approach to her own child.

Many teachers, although not required to give class instruction in these matters, feel greatly the need of assistance in meeting individual problems arising in school life. Over and over again Miss March has demonstrated her sympathetic understanding of the difficulties of adjustment which boys and girls undergo during adolescence. Those teachers who have forgotten their own youth, and who regard with wonder or impatience the instability of the emotional nature of pupils during these years, will derive much profit by a close study of the chapter on Supervision.

Personally, I feel a debt of gratitude to Miss March because of the help which I have received from her book. I have been instructed both in matter and in method from its pages; encouraged by her fearlessness, inspired by her practical idealism, and cheered by her optimism. It gives me great pleasure to know that its usefulness is to be extended by the production of an American Edition.



510 Commonwealth Avenue
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TOWARDS RACIAL HEALTH

CHAPTER I

Introductory

"As Man is educated by his Father, God, so must the child be educated by his father, the adult man. . . . The child will develop into the adult, and he cannot too soon be initiated into the life which, as the adult, he will have to lead. The process of educating the child is not merely analogous to the process of 'saving' the man. It is the vital part of it. For childhood is the time when human nature is most easily moulded; and the bent that is given to it then is, nine cases out of ten, decisive of its ultimate destiny." [1]

The twentieth century is well spoken of as the "Century of the Child," for this saying of Mr. Holmes is the embodiment of twentieth-century thought on child-life—thought, the outcome of knowledge, concerning the welfare and importance of the child which has expressed itself in a multitude of reforms. New laws have been made for the protection of child-life, old laws amended; during the first thirteen years of the century no less then twenty-four Acts of Parliament dealing

[1] *What Is and What Might Be*, by Edmond Holmes, pp. 43, 44. Published by Constable.

with the protection of children were passed, and in 1913 a special division of the Home Office was created to deal with questions relating to children. This century has seen a great advance in medical science concerning the health, nutrition, and development of the child, and from this knowledge of the child in health a new phase of the medical task has developed. Much of the ill-health of children and adults has its origin in infancy and little-childhood; the great effort now put forth is to watch over the child to see that all is being done to secure perfect growth and health, to detect the first signs of weaknesses, and prevent, so far as is possible, their obtaining a hold.

And so we have a multitude of Health Societies, Child Welfare Associations, Schools for Mothers, and so on—societies carried on mostly by voluntary effort, and through their agency much knowledge concerning the rearing and management of children is making its way to the untutored section of the public. Mothers and fathers are beginning to make much more of a thoughtful study of the needs of child-life than they used to do in the past, when children were brought up "by rule of thumb."

Of education in the narrow sense—school education—teachers are only too well aware of the many theories put forward, tested, dismissed as impracticable and useless, or accepted and adopted as beneficial. People air their views in speech, lecture, and writing; others discuss. Some workers put into practice first, and still other devotees to reform show the correlations; they find the bearings, view other aspects of the question and investigate the relation of other circumstances, so that, often, what first appeared to be a comparatively

simple problem is found to be a complex of many factors, the value of each of which is to be known and understood in its relation to the main theory. And in time, from all this activity of thought, practice, discussion, and association, a policy emerges, is adopted, finds a roothold, and becomes established. The whole matter is summed up, the central idea and correlated factors are gathered together into a whole, and we are placed in a position of intellectual security so far as our present circumstances and knowledge allow.

In fact, everything goes to show how greatly we are realising that *the child* is the central fact of a nation's progress. What a nation comes to be is evidence of what its children have been trained, allowed, and encouraged to be. A nation's life goes on for unnumbered generations, the child's life but for one generation. Yet each generation is the parent of the next, and it rests with this generation to secure the well-being and progress of the next—a fact that is being more and more acutely realised.

Here the problem of the child is with us still. ". . . Childhood is the time when human nature is most easily moulded; and the bent that is given to it then is, nine times out of ten, decisive of its ultimate destiny." How, then, are we to teach and train the boys and girls of this generation in order that they may become, worthily, fathers and mothers of the next? Evidently, if we wish to determine the bent in the right direction, we must begin early. Childhood is the sowing-time. Nature herself has appreciated this great truth, though we may have been slow. Has she not stirred the childish thoughts into ripples of inquiry? How early do children realise there is a mystery they

must solve! "A little child shall lead them." But we have been slow to recognise the lead and to follow. And because a generations-long habit of ignoring or evading the early questions concerning the coming of new lives into the world has brought in its train many complexities and difficulties, to present-day parents this preparation of the child for their adult responsibilities may seem a difficult problem to tackle. Indeed, society itself and social life generally have in many ways tended to add to these apparent difficulties, so that now we find the task of fitting children for their possible future responsibilities is not only concerned with the simple story of the transmission of life from one generation to another, but that there are many associated problems with which we must concern ourselves in order that we may fully appreciate and valuably perform our task.

The task seems to present itself naturally in two phases. First, and most important, it is to convey to children a knowledge of the facts and laws of human life transmission, and to lead them to realise "all the grandeur and the beauty hid in birth," and from these beginnings to work, training the mind and the soul, so that parenthood will be understanded of them and, when the time comes, nobly undertaken. This is the upbuilding or positive phase of our task.

And the other phase is this. Great gifts bring great responsibilities in their train, and great risks of loss and damage; this greatest gift which mankind owns, the gift of sex, must be safeguarded, protected from evils which may assail it. Society is much more elaborate and complex in its workings than it used to be in the days of our forefathers, and with this vast advance in com-

plexity has come increase in social problems. Some of these problems are concerned with the spread of vice, of disease, of misuse of powers, of failure to achieve the noble and upright. And it is from these evils that the children must be protected. That is the second, the negative, phase of our task. The power that Man possesses, in common with " all creatures that on earth do dwell," but which has reached its fullest blossoming in Man, is the supreme power, the exercise of which carries with it the greatest responsibilities. Each organism is the trustee of Life, and carries with it the power of passing on that Life to another generation.

Living things are governed by the Law of Progress, and Man has achieved the greatest progress. In obeying the Law of Progress, living creatures have improved—we say 'evolved' — their powers and their attributes have evolved. The processes by which a living creature produces new living creatures are known as the processes of 'reproduction,' or the 'racial' processes, and creatures are led to perform this duty towards their race by the impulse and device of 'sex.' In Man, who has reached the highest steps in the path of progress, we find the highest development of all organic processes, powers, and attributes. So that in regard to the racial processes, and in regard to the methods by which the creature is impelled to the performance of these racial processes, *i.e.* in regard to sex and all its manifestations, we find in Man the highest developments, the most elaborate and the most difficult to understand. So also, in Man, do we find them fraught with the greatest dangers and risks. And in Man, too, is the progress towards maturity of function the most intricate, won-

derful, and at the same time the most painstaking work of Nature.

Hence it is that, if we are to feel ourselves confident and competent, we must make ourselves well aware of what we have to do, of the forces which work for us and of those which may be against us.

1. We must understand the nature of children, their thoughts, their feelings, the hidden mental and emotional processes, especially in regard to those concerning sex. We know that everything concerning sex is intimately bound up in the development of man from childhood to adulthood, and is wholly destined for *good*. That is the force we must understand, and must protect from possible wrong direction or injury.

2. We must know, too, the ways in which the body grows and is to be maintained in health ; a knowledge of the physical development of children will aid us greatly, linked up as it is with mental development ; then shall we be able to exercise intelligent supervision over child-life.

3. Then we should know how to talk to children and how to teach them so that we may present the facts of birth and parenthood in the most acceptable way, presenting them in such a way that the physical facts are made clear, and at the same time the wonder and the sacredness of the laws governing sex and parenthood are revealed in all solemnity and reverence.

4. Boys and girls growing up into manhood and womanhood — ' adolescents ' as we call them in a comprehensive term—present a special claim on our attention. They have many problems of their own, concerned with health of body and health of mind. The load that the adolescent has to bear may frequently

be a heavy and difficult one, but its weight may be lightened and the journey towards adulthood accomplished in comparative serenity and ease if those who have the guidance of youthhood in hand know how to inspire, how to mitigate the difficulties, and how to help on towards the goal.

5. To that end, we must inform ourselves of the possible risks and dangers which may beset the path of children and of adolescents. Many of these dangers may lie in connection with health, mental and bodily, others have to do with morals, and though some may arise through accidental discovery, most of them are due to some detrimental social experience or happening.

6. And, finally, because we hope to fit our boys and girls to become worthy fathers and mothers in their turn, because we hope to instil a keen sense of racial responsibility, we, ourselves, must know something of the relation of the individual to the race; we must understand some of the factors in race improvement and some of the causes of race decay. Then we may be able so to weave into our care and guidance of child-life a thread of gold, a thread which shall make its way from the fabric of our own lives into the fabric of theirs, a thread that is known as the Ideal.

The training of children is no light task to be undertaken thoughtlessly and unpreparedly. Only if we are sure in our own knowledge shall we be able to carry conviction in our teaching and to avoid mistakes. We have to remember that Nature begins very early to formulate her plans and to lay the foundations of her structures while the child is yet very young. There is a long preparation period, every step of which must be accomplished with certitude and with safety if adult-

hood itself is to be perfect. Moreover, children vary very much; no two children have exactly the same way of looking at things, have exactly the same disposition, exactly the same environment or upbringing. That which is understanded of one with ease, is an incomprehensible mystery to a second, and does not exist at all to the intelligence of yet a third.

Again, children come under many influences; it is impossible to hedge in a child so that it comes under no influence save that which we may desire. As far as lies in our power, though, we may see to it that the influences under which they come are good, and for the rest, beyond our control, possible harm may be prevented if the personality is so developed and fortified as to be immune to the influence of deteriorating circumstance and experience.

The two great factors which may be made to influence strongly the life of most children are, of course, the home and the school, and one can foresee great possibilities for the good of the child when these two forces are working together in perfect harmony of aim and spirit. Many children, however, are so unfortunately situated that their home influence counts for little, if any, that is good, and may be even antagonistic to good; these children are more greatly dependent upon the help their teachers can give them.

Then, too, we have to consider the influence of their companions and playmates, the influence of their leisure occupations, and, in the days when school is over, of their work. The problem of playtime, of the leisure hours, is fraught with poignant import. Many are the efforts of social workers, inaugurating and conducting boys' clubs, girls' guilds, seeking to satisfy youthhood's

natural craving for excitement and interest by healthy occupation of the leisure hours. Some children, young and older ones, are fortunate enough to come within the sphere of religious influence and, impressed, to be retained within its fold.

In this book, therefore, which is intended for adults, it is aimed to show how these influences under which the impressionable years of infancy, childhood, and youthhood are spent may work together for the good of the children ; how one influence may help and stimulate the other ; how one may make good the deficiencies of the other, if need be.

Let us look for a moment at what may be called, for the sake of brevity, sex instruction. How is it to be given ? Following Nature's own lead, as shown by the early questions of the little child, we must begin to unfold the story of birth during the years of little-childhood, and after the fact of motherhood has been grasped, gradually and unobtrusively, very beautifully, the story of human parenthood should make its way into the child's mind. The simplest and most reasonable way in which this may be done is by making use of the wonderful array of example and illustration provided by the living plants and animals about us, so that the child becomes familiarised with the processes involved in the transmission of life from one generation to another, and becomes acquainted with the right words and terms in which to clothe the facts, all by study of simpler types than the human. Some children have ready, alert, mental activity, and quickly associate one fact with another, realising the whole story in a quick, vivid flash of insight. Other children have thoughts that come ponderously and slowly and need

many more facts and details to help them up to the goal.

If the facts of human parenthood are to establish themselves firmly in the young mind and if, moreover, they are to establish themselves in the right attitude and draw unto themselves the right and not undue proportion of consideration, they must be shown in relation to the whole of organic life ; the laws of reproduction govern the whole of the kingdom of living things—Man is not alone on the mountain : he is, though, at the summit. It will be evident, therefore, that, in the school, by a careful arrangement of Nature Study, helped by keeping school pets and home pets, studying the habits and life of plants and animals, much may be done to make clear the fact that certain laws and processes obtain in essentials, throughout living creatures, so that when details of the human processes are later referred to, in intimate confidence between parent and child, the child may, as it were, say to itself, " I seem to have known that all along."

Sex instruction, however, cannot faithfully be regarded as complete if it stops short at this point, for we are only at the beginning. The very object in giving these facts of information on human parenthood is that the child's mind may be prepared to accept further information as time goes on, and may be ready to appreciate the meaning of coming changes—the changes of body and mind which accompany the dawn of adolescence. This is simply the first step to be accomplished in direct education for parenthood. There are many more to follow.

Side by side with the incoming knowledge of the physical facts concerning birth and parenthood, a grand

ethical concept must make its place. This important phase of training is even more important than training in knowledge only, but its full magnitude of possibility and its potential influence for promoting integrity can only be adequately realised and obtained when we have a knowledge of physical facts to go upon. The best preparation for life's responsibilities combines a knowledge of the facts of sex, and the important part it plays, with a deep appreciation of its power of working for the good of humankind. Therefore must it be our great effort to bring this truth home to our boys and girls, so that their thoughts and conduct may be kept on a high plane, and that they may mould their aspirations towards the best and the noblest in desire and in attainment.

Nature has decreed that her races shall be carried on, and in entrusting the work of producing a new life to the effort of two individuals, she has made certain that her purposes be carried out, by bringing the two individuals together, making them mutually appreciative of the influence and attraction of one another. This is the Law of Sex Attraction, which has reached its highest expression in Man. The great power of Love which brings man and woman together in a lifelong comradeship and union, combining as it does the forces of physical attraction with the mighty forces of the soul, is at once our greatest strength and our greatest weakness. It is the mainspring of all that makes the greatest joy in life—of marriage, home life, parenthood, filial love. Let us see to it that the ideal of Love which we foster in the minds of children is so clearly illuminated that they may be truly sensitised to its influence and may never mistake its shadow for its substance. For if the

way behind lies strewn with the dead bodies of past experiences, of dissipations, of wasted, misspent sex energy, Love itself, when it comes into the life, will be tempered with regret that its fullness has been depleted by the unwisdom and ignorance of the past.

. . . . . .

To turn now, briefly, to some suggestions for a practical policy, we must recognise that, ideally, all the intimate personal details of sex instruction should form part of the general confidence between mother or father and child. At the same time, we must recognise that many parents at the present day have not had the benefit of such wholesome instruction themselves in their youthhood, nor have they, as a general rule, had much acquaintance with Nature Study. Hence they may feel themselves unable to carry out this part of their responsibilities without first receiving help. And again, there may be, nay, are, parents who are not sufficiently thoughtful upon the needs of child-life in this respect. They must be brought to realisation. And, lastly, there are parents who are totally unfitted to give the right bent to their children's thoughts : the welfare of their children will be better served in other hands.

It is wise, therefore, for us to consider this matter of educating the parents themselves, and one may suggest that this may be done in considerable measure by organising meetings of parents, where, under the sympathetic address of one who entirely understands the feelings of parents and the welfare of the child, their duty and its manner of performance may be made plain. Should such a meeting be arranged by the school (and through the schools, the greatest number of the nation's parents may be reached), opportunity

could well be taken to show how much the school can do to help, to reinforce, supplement, and extend the work of the home. For at school, where we have the full advantage of good pedagogical methods, nature study helps towards an understanding of the racial functions and processes; physiology and hygiene may incorporate the racial organs in their scheme; mother-craft, domestic economy, and needlework supply a practical note in the training of girls; literature, history, Bible knowledge give many opportunities of making plain the way of the Ideal. Nor is this all; so much may be done during the school years to direct the inclinations of boys and girls along lines of healthy employment and to cultivate their taste in regard to occupations of work and of play; for when the days of school are over, these occupations of work and of play come to be of prime importance in their influence upon boy and girl life.

Nor is the school the only way of reaching the parents and of helping them. We have only to think of the many social and semi-educational organisations—Women's Guilds, Boy Scouts, Girl Guides, Church Societies, Boys' Clubs, Settlements, and so on—to realise that here is another great army of workers, who may reach out a helping hand to parents, and who may join their effort with the other forces in the field. Indeed, it may frequently fall to the part of the club leaders to be ready to make good what should already have been done, and to put forth their effort both directly and indirectly, to safeguard the boys and girls of their district.

Though much may be done collectively in connection with general information on the biology and physiology

of sex, and in connection with ethical training, we must realise how very important it is that the child's sensitiveness and sense of privacy should not be wounded; and that each child, boy and girl, should feel that there is someone to whom they may go in case of difficulty; where there is anything they do not understand that they may always know that their one counsellor, whether it be parent or some wise parent-substitute, will be ready to help them and to make things clear. This is why it is so greatly important that the guides of childhood and youth should be fully informed themselves, so that they may be ready to answer the questions which may come. To some children a word or two conveys volumes, and they are easily satisfied; with others there is almost no limit to their demands, but these demands must be satisfied, not evaded. Then, again, some children are naturally refined in their nature and ideas, while others tend to look at life vulgarly and coarsely. But that must not deter us from the effort to help. Can we do nothing to give even the roughest, most neglected, and vulgar young girl of the slums such a knowledge of herself and such an appreciation of her powers of womanhood that she would vigorously resent, with all her natural crudeness and roughness, any attempt to infringe her self-respect or despoil her virtue?

I have, in the chapters which follow, attempted to give a survey of both the positive and negative aspects of this phase of education and training of child-life, in order that adults may put themselves in possession of information which may help them to contribute their part, whether it be as parent, teacher, church or social worker. A complete education may, it seems, only be achieved through the agency of all, so that each

should be prepared to recognise his opportunity and to seize it, dealing with it in his own particular way. No two people are likely to have exactly the same views, nor are they likely to have identical experience, and any effort they may put forth will inevitably be coloured by their personality. How greatly important it is, therefore, that the instructors of youth should not only know their subject, but should have the right attitude towards it, so that they may be able to speak with ease, with dignity, and with reverence!

"Each mind has its own method." [1] Each personality casts its own glow. And because I am humbly aware of these truths, my aim must be to give a brief account of facts, to offer a few suggestions, to compile some details which may help on the practical side, and thus endeavour to gather together in one volume items of information, hitherto scattered, which bear upon one another and upon this subject of education.

[1] Emerson, *Essay on Intellect.*

CHAPTER II

The Physical Development of the Child

The student of child-life recognises that development of the child passes through certain phases, physical and psychological, in more or less definite sequence. It is customary, therefore, to identify certain periods of childhood, according to the condition of mental and bodily growth which characterises them. These periods may be indicated as being from birth to seven years of age, constituting the first period of childhood; from seven years up to fourteen, this constituting the second period of childhood. At the age of fourteen, certain striking changes in bodily and mental development manifest themselves, showing that childhood is passing away, that the dawn of youthhood has come. These ages—seven years, fourteen years—are not absolute punctuations in the development of the child; there is a gradual transition recognisable to the tutored adult intelligence: moreover, the ages given vary very considerably in different children; some children enter youthhood at an age earlier than fourteen and others at a later age, and the average age for girls is somewhat lower than the average age at which boys manifest the bodily changes indicative of this new phase of development. Not only are there numerous individual variations, but the rate of development varies in different

races : some writers are inclined to ascribe this variation to the effect of climatic conditions, but serious objections to this climatic theory exist, and other writers, recognising these objections, incline to the theory that the differences are due to racial peculiarities. Then, too, within the limits of the race, social condition is sometimes held responsible for the variation in rate of development. It is said that in girls of the upper classes the beginning of puberal development (as the transitional stage is called) is attained at an earlier age than in girls of the lower classes, but here, again, no definite substantiation in the form of statistics is available as confirmation. It is thought, by some authorities, that girls living in towns mature, on the average, earlier than girls living in the country : this is another point in connection with rate of development upon which opinion is not yet unanimous.

The period of puberal development is of several years' duration ; as will be seen more fully later, the bodily changes and mental transformations take place gradually, and when puberal development is complete, the child is fairly launched into the next epoch—adolescence.

In order that the full significance of these periods of growth be understood, and in order that their bearing on the subject of sex education may be appreciated, it is necessary to know something of the organic and psychic changes and conditions which are involved.

Nature makes very sure of her essential parts being strong and her essential functions being firmly established. When we open a flower-bud, perhaps a crocus bud just making its way from the corm or a fuchsia bud hanging unopened on its stem, we find the stamens and

the pistil—the racial organs—already well developed in form and size ; indeed, they are, relatively, considerably more advanced in development than are the other less-important parts of the flower. This careful provision towards ensuring the perpetuation of the species is seen to be made by animal types also, that part of the organism upon which the racial functions devolve being, in the processes of organic development, very early distinguished. So that we are not surprised to know that in the human child at birth the racial organs are already present and well formed, the uterus, for example, being at birth about at the same stage of development as it is in a girl of nine. To return to the illustration of the flower. After it has opened, the corolla enlarges and unfolds, the tint of the petals is deepened and its markings strengthened, the nectaries grow in size and become ready to produce their attractive secretion. During this time of what may be called ' bodily ' or ' somatic ' [1] growth, the stamens and pistil have grown comparatively little ; they have experienced a period of rest during which the bodily parts are rapidly developing to that state of perfection which makes for the certainty of fertilisation taking place. Then, rapidly the racial organs complete their development and become functional. So, too, in the child, after birth there is a period of arrest in the growth of the sexual organs, during which period bodily development proceeds rapidly and regularly. From birth to four years of age, growth in girth is characteristic, as it is also from eight to ten years of age,

[1] It is usual to distinguish the constitution of an organism as ' germ-plasm ' (that tissue which is destined to reproduce and to become the beginning of the next generation) and ' body ' or ' soma,' the whole organism which surrounds the germ-plasm.

while the two periods during which growth in height is relatively predominant are from five to seven and from eleven to fourteen years. In general, the rate of growth of boys exceeds that of girls, except during the second period of growth in height, the average height of girls between the ages of eleven and fifteen years being greater than that of boys during the same period, though at all other times the reverse is found to be the case.

During the first period of childhood, beyond the differences in the reproductive organs, there is comparatively little difference between the sexes. Towards the end of this period, however, and continuing during the second period of childhood, differentiation becomes more evident. Allowing for individual variations, it may be said generally that the hips become broader and the body more rounded, in proportion, in the girl than in the boy; the girl's hair tends to grow at a more rapid rate and the characteristic development of the breasts begins to take place. In both sexes towards the end of the second period of childhood, the axillary and pubic hair (*i.e.* the hair in the armpits and between the hips) begins to grow. The boy's shoulders become broader, his body more angular, his muscles stronger than those of the girl, and towards the end of the second period of childhood a marked change takes place—the 'breaking' of the voice—while in girls we have the beginning of the costal type of respiration, that is to say, the ribs tend to rise and fall conspicuously in breathing.

These obvious changes in bodily form and function are indications of internal changes which are in process, and may be appreciated, according to their degree of manifestation, as heralding the approach of puberty. The wise mother will be, by them, led to understand how

far on life's way her little daughter or her young son may be; so that, guided by these physical signs and also by her sympathetic understanding of the mental processes which are taking place at the same time, she will know when she should forewarn her boy or her girl of the changes which are likely to take place.[1]

The new phases of mental development and the differentiating bodily characteristics which, along with others less evident, arise during these years of later childhood are spoken of as "the secondary sexual characters"; they are, as has already been pointed out, evident in the girl at a relatively earlier age than in the boy. They are indicative of the activity of the racial organs.

These organs have two functions, the one being to produce and discharge from the body the racial elements (the testicles producing 'sperms' in the male, the ovaries producing 'ova' or 'eggs' in the female), and the other being the production of an internal secretion. The racial organs are glands, and as such they have the power of extracting substances from the blood, from these substances forming, through the activity of part of their cellular substance (the interstitial cells), what is known as an 'internal secretion.' They share this power with other glands in the body. The thyroid gland, that mass of modified lymphatic tissue which lies in the neck at each side of, and across, the windpipe, in addition to its function of destroying toxic products (poisonous matters produced in various ways in the body), produces an internal secretion which exerts a specific influence over the body, aiding the processes of general nutrition. The pituitary body, a small outgrowth

[1] See Appendix, "Suggestions for Parents."

of the brain, the function of which has only comparatively recently been understood, also is the seat of an internal secretion which aids and regulates the general metabolism of the body and the development of its various organs, particularly of the skeletal system. Other glands too, the liver, the adrenal glands, etc., are known to produce secretions which exercise in various ways, and towards various organs, an exciting or controlling effect, this stimulating effect being due to the presence of certain chemical substances called by Professor Starling 'hormones,' present in the secretion. It seems as if we may regard the glands as a wonderful organic control, stimulating, regulating, and aiding either another gland or some other part of the body, in development, in establishment, in perpetuation, and in functioning. Each gland has its own specific function to carry out, and in several cases may have more than one function.[1]

The sexual glands, then, produce an internal secretion containing chemical substances, 'hormones.' This fluid finds its way into the blood-stream, circulating by this means round the body, supplying the necessary stimulus for the formation of the secondary sexual characters, both physical and mental, nourishing the reproductive organs, and stimulating the nervous zone attendant thereon. It is held to be strongly energising in its effect. An example from everyday life will serve

[1] For a concise survey of recent work in connection with the glandular secretion, the reader will find an article entitled "Internal Glandular Secretions and their Influence on the Causation of Disease," by Dr. R. Murray Leslie, in the *Clinical Journal*, 13th August 1913, useful. *The Human Body*, Keith, Home University Library (1s.), also refers to the various internal secretions and their effective control over the body.

to bring this out clearly. The ox is a male creature which had its racial organs destroyed in its young days; the bull is left undisturbed organically. The fiery, powerful, excitable nature of the bull is in great contrast with the placid, slow-going nature of the ox, which has evidently suffered in loss of energy and power through the process of castration. The male and female chickens of the domestic fowl are all alike, so far as external appearances go, for the first twenty to thirty days of their existence, but after the thirtieth day the essential cock-like characters begin to develop in the male, continuing to differentiate themselves more and more widely from the hen type, the wattles, the comb, the distinctive plumage all becoming quite clearly marked. If a young cock has been deprived of its testes quite early in life (before the thirtieth day), it fails to develop a comb, wattles, the typical plumage, and vocal powers of the cock. If the removal of the sexual organs takes place later, the secondary sexual characters may be more or less developed, though, of course, the racial function is inhibited. In fact, it has been shown that the development of the secondary sexual characters begins with the appearance of interstitial cells of the racial organs, and this appearance and consequent functioning of the interstitial cells takes place considerably before the development of the racial elements.

In man, observation leads us to know that the internal secretion of the testes and the ovaries begins to circulate in the body as early as seven or eight years of age, leading to the development of the secondary sexual characters, though the essentially racial function of those organs is not assumed till much later, and if by

any means this internal secretion be prevented from finding its proportionate destination, if, for example, referring to the functions of this secretion (stimulus of latent secondary sexual characters, physical and mental ; nourishment of sexual glands ; stimulating the nervous zone of these glands), an undue proportion is directed towards the stimulation of the nervous zone, then the other functions are liable to suffer, according to degree, from the over-direction of internal secretion towards the one destination. This, however, is leading to a part of the subject with which I shall deal more fully when considering the problems of education, just emphasising here that it is highly important that we should understand and appreciate the rôle of the internal secretions.

Let us turn our attention now to the second function of the racial organs, the formation and liberation of the reproductive elements. As has already been pointed out, during the first period of childhood and the early part of the second period, the racial organs grow very little in size ; but towards the end of the second period of childhood, growth of these organs is extremely rapid, and the end of childhood is marked by the coming into activity of the germinal cells, sperms in the form of spermatic fluid are liberated by the testicles, ova develop and are released from the ovaries.

The spermatic fluid finds its way from the testicles into two small reservoirs, and when these become surcharged, a natural overflow of the ' semen ' (as the mixed secretions of the testes and some related glands are called) occurs. This discharge or ' emission ' is accomplished by muscular action of the penis, causing ' erection ' of that organ, and usually occurs in normal healthy boys during sleep to the accompaniment of more or less

vivid dreams. If an emission occurs during the waking hours, the boy is conscious of high nervous stimulation, accompanied by pleasurable feelings in this region. These emissions usually begin to occur in boys over fourteen, and may take place in the natural course once a week or once a fortnight. A more frequent occurrence is usually abnormal.

This period of puberal change, during which the body is becoming accustomed to its new functioning, extends over one or two years. It may be said to have begun when the voice begins to break, and to be established by the time the voice has permanently fixed its lower register.

In the girl, during the period of puberal development, the racial organs grow rapidly: the uterus enlarges and alters its proportions; the ovaries become racially functional, liberating at four-weekly intervals an ovum or egg. This ovum finds its way into the oviduct (Fallopian tube), thence passing down to the uterus (or womb), accomplishing the journey in from eight to twelve days, and, in the ordinary course of events, is lost. This is very easy, it is so small, being only $\frac{1}{125}$ of an inch in diameter. We have to remember, however, that the ovum is a potential new creature, and that if it meets with and is fertilised by a sperm in its journey from ovary to uterus, a new life has begun. In the human type that new life is nourished and develops for a period of nine months within the maternal body. As an ovum is liberated every four weeks, so the body may be called upon to provide material for food and growth of a new creature every four weeks, and must be in a condition to allow of that extra expenditure. All the nutrient material for the developing embryo

which is fixed to the wall of the uterus is derived from the maternal blood-stream. Hence we see that if the ovum be not fertilised, there is a surplus blood supply, which is under these conditions not required, and it makes its way through the small blood-vessels of the uterus, bringing with it the lining of that organ. This periodic discharge from the uterus, known as the menstrual flow, is a perfectly natural function of the body, and should not be regarded as an 'illness.' Its first occurrence manifests the end of childhood. During the two years after this, physical and mental changes take place quickly; the change from childhood to youthhood is complete. These years of puberal development are, however, a period of physical instability, of psychological change; they are years, therefore, during which the growing girl, as well as the growing boy, needs careful supervision in order that adjustment to new conditions of life may be safely achieved. The body comes under the reign of periodic action; slow accumulation of surplus material, a corresponding concentration of this towards certain organs, and a sudden release of it constitute a rhythm of physical condition, and because the psychic condition is dependent upon physical condition, the nervous functioning being inextricably interwoven with the other functionings of the body, a corresponding psychic rhythm is established. In fact, Dr. Stanley Hall goes so far as to say, writing of periodicity in women and girls, "Every day of the twenty-eight she is a different being." And though a woman is not actually conscious of a day-by-day variation, we can appreciate the physical foundation upon which Dr. Stanley Hall's comment is based.

While these important changes are taking place in

the racial organs, and are becoming established as part of the regular organic performance of the body, other changes in growth and development are occurring. There is a steady progress of muscular, skeletal, and organic development during the years from fourteen to twenty-five, not, though, at exactly the same rate. Growth in height is more rapid in girls than in boys between the years of eleven and fifteen, after which increase in height is comparatively little in girls, and more rapid in boys till about eighteen or nineteen years of age. After this period of rapid increase in height, in both sexes a slow, slight increase takes place till about twenty-five, or, in some cases, after this. Increase in height is due to increase in length of bone, and as the muscular system does not develop in bulk in exact proportion with the skeletal development, the body becomes lanky; muscular loosenss and lack of co-ordination lead to the 'awkwardness' that is so characteristic of the young adolescent. In girls, besides increase in height of the skeleton, certain alterations in shape take place, the pelvis becoming wider and deeper, leading to a widening of the hips. Skeletal development, however, in due course, lessens its rate, and the body supplies are more devoted to increasing the size and strength of the muscles; in girls, a considerable development of fat takes place, leading ultimately to the fully rounded contours of womanhood. Internal organic growth keeps pace with external development, though, here again, during adolescence, growth is not exactly proportionate; at one period one organ specially makes progress, at another time another organ is experiencing its period of rapid development; the heart, for instance, increases considerably in size, while the

blood-vessel system alters comparatively little in capacity, thus leading to greater blood pressure. This fact may be held to account largely for the increased exhilaration and excitement, for the intense activity, which are so characteristic of youthhood. In girls particularly, the complexion becomes clearer, the hair and the eyes become brighter. The boy gradually becomes merged into the man, gaining height and breadth of figure, hardness of bone, enlargement of the larynx, with its correlative lowering of the voice-pitch, and he, in the average case, reaches maturity at the age of twenty-five, while the girl's complete development is attained a year, or perhaps two years, earlier.

This brief survey of development would be incomplete without a reference to another punctuation, the end of the reproductive period. When the ovaries cease being productive of ova, they shrivel in size, and the various functions connected with ovulation cease, more or less irregularly. This period is known as the 'climacterium,' the 'menopause,' or the 'change of life,' and usually covers a number of years between forty and fifty. In men, the cessation of reproductive activity is less emphatic in its manifestation, but may take place about the age of fifty and later—being much more variable in time of occurrence than in women. This period of change is, in both men and women, a period of physical instability, and often of many physical disturbances, when considerable care of the health is necessary to ensure a safe transition towards the years of senescence when "the almond tree shall blossom and the grasshopper be a burden."

CHAPTER III

The Mental and Emotional Development of the Child

Let us now turn to the psychological aspect. As the years of life from birth to maturity reveal a constant progression of physical change, so also do they manifest a serial of mental development. The infant is conscious of little beyond dissatisfaction; he realises and gives expression to his realisation when his bodily comfort is interfered with; his primal need is food. Instinctively, he demands this in baby-way, if it be not forthcoming as soon as the instinctive craving, hunger, awakes. If he is hurt physically, or if his body organisation is not working in perfect accord, he becomes conscious of discomfort or pain, and again reacts to the consciousness. It is only by degrees he becomes conscious of environment, able to distinguish between that which is 'self' and that which is 'not-self.' And through the months and years succeeding birth, his mental development is one long, ever-widening, ever-deepening experience of environment, learning to distinguish and appreciate his surroundings, animate and inanimate, slowly coming to understand, in some degree, the part they play in his well-being. The first years of childhood pass in happy guilelessness of utter absorption in 'self'; it is only during the end of the first period of childhood

and the subsequent years that a slow incoming of personality leads him to realise that the 'not-self' is predominant and that the 'self' has a minor part to play, that the world was not made for himself, but that he, as a person, has to fit into his place in the world. Self-consciousness is past the dawn; it is spreading over the sky.

It is curious to realise how very little of what we experienced before the age of three or four years lingers in the memory—to most of us our life before this age is almost wholly blank. Yet the things concerning these early years, which we do remember, seem to be readily and vividly recalled; that which has thoroughly absorbed the attention seems to be tenaciously held by the memory, which in these early years is apparently very plastic. This has a very potent application in regard to the habit-life; physical habits learnt in early childhood are very prone to persist and constitute a lasting basis for character-formation.

To turn to the mental aspect of sex phenomena, during infancy and the years immediately succeeding infancy, the child is absolutely unconscious of sex; so far as sex impulse is concerned, we may say the emotional condition is sexually neutral.

In the second half of childhood, while physical differentiation between the sexes is taking place, mental differentiation, which to some extent foreshadows later functions, becomes evident, each sex gradually deviating in its own specific direction from the neutral line.

The little girl plays with her dolls, nurses, dresses and feeds them (eating the food herself to preserve the sequence of ideas), and in every way tries to be a 'little mother.' Later she begins to be fond of needlework,

tries her hand at things domestic, still retaining the 'mother' instinct which now begins to express itself over babies rather than dolls, or perhaps, one should say, as well as over dolls, accepting for expression whichever comes her way. Force of circumstance makes many 'little mothers' in the homes of the poor!

While the more feminine occupations and interests are beginning to monopolise her attention she is gradually losing some of the interest she used to take in the rough and noisy games in which she used to join her brothers. Boys and girls play very contentedly together during this first period of childhood; their interests diverge later. Probably in a certain degree, education (using the term in the wide sense) is a directive force moulding the trend of interest, but also undoubtedly a biological impulse, the circulation of the internal secretion of the racial glands, plays a part in determining that the mental, occupational, and emotional interests of the girl should be of a nature more passive, less aggressive, quieter, and less expensive of energy than those of the boy. To appreciate the significance of this, let us consider briefly the biologic situation.

Except in some of the very lowest forms of animal life, we find a new life arises from a fusion of two dissimilar elements—the 'ovum' and the 'sperm.' That body in which ova are produced is called 'female'; that which produces sperms is 'male.' The ovum itself is characteristically stationary or only capable of slow movement; it is rich in nutritious substance and, consequently, it is very large in proportion to the sperm, which it attracts towards itself through promoting certain chemical influence. This latter element, the sperm, is typically very motile; it has to find its way

to the ovum ; consequently its bulk is small, its energy great ; it yields to the attractive force of the ovum. The essential part of any organism is the germ-plasm (*i.e.* the tissue which produces the reproductive elements), and the body or 'soma' is composed of all structures developed round the germ-plasm. The production of ova makes great demands upon the organism. Moreover, in the higher animals, the mammals (and a few members of lower grades), provision must be made for the nourishment of the growing creature within the maternal body during a varying period, according to the type, after fertilisation has taken place. This, again, means great demand upon the maternal resources, so that we have a type of body developing round the ovum-producing germ-plasm which is pre-eminently passive, which is conservative of nutriment and of energy. Similarly the type of body which develops round the sperm-producing germ-plasm tends to be imbued with the characteristics of the sperm—to be active, aggressive, unconservative, and attracted.

Having grasped this principle of intimate association between function and structure, we may return to the question of sex-differentiation and endeavour to realise that, though education may have something to do with the direction which the physical and mental development of the boy and the girl respectively take, there is also a deep, inborn impulse for development to proceed in such ways as shall assure accomplishment of the predestined function. We must remember that, fundamentally, men and women are biologically and consequently psychologically different organisms.

Psychologists lead us to recognise this stage of later

childhood as having a definite relation to the sexual life in so far as emotion is concerned; it is designated the period of "undifferentiated sex impulse"—'undifferentiated' because the direction of impulse has not yet become clearly defined. It is a stage in the life of the normal child during which ardent affection of a more or less passionate type may often be focused upon individuals, regardless of age, regardless of sex. Very often the adored one is considerably older than the child, as in case of a young pupil forming a passionate attachment for a teacher, or of a young boy for a woman of mature years — an attachment that is beyond all ordinary definition of affection, one which embraces all degrees of sentimental feelings and ideas, and even may include jealousy. Particularly in boarding-schools for girls does one meet with instances of this sort: a girl will become infatuated with another girl—it may be younger, but more often older, than herself—or with a mistress in the school. Such infatuations often become the fashion, leading to an unhealthy tone about the school.

Those cases which are simply imitative are easily discouraged and soon forgotten, but there are instances of this undifferentiated stage persisting, particularly if unwisely fostered, and forming a basis for perversion. In the main, though, the stage of undifferentiated sex impulse, though it may extend over a number of years, even to early adolescence, gradually passes away, to be replaced at a later age by normal impulse towards the opposite sex. Moreover, it is by no means a rule that every individual passes through this stage; and very often in those individuals in which it has occurred, it frequently passes away from the memory altogether,

as it yields in ordinary normal development to the incoming of the normal differentiated impulse. At the same time, many adults can look back to their younger days and recognise an experience of the type which has been described.

Although the years immediately succeeding birth are devoid of any conscious sex impulse, and although that impulse may express itself only in an undifferentiated direction in later childhood, we are led to know that the early years are years of extreme susceptibility to impression, which, at the time, is quite unrealised, yet leaves a lasting effect upon the ego. We are indebted to the work of Professor Freud of Vienna for great illumination of this field of sex psychology, although, as he, himself, has from time to time remodelled his conclusions in the light of further research, and as other workers of his school express views which in the main are in harmony with Freud's, yet in many respects are modifications of Freud's conclusions, his theories do not yet find universal acceptance. However, it seems quite clear that the unconscious psychical processes play a very great part in nervous pathology, and that many manifestations of hysteria or other neurotic conditions owe their origin to some experiences which have occurred in earlier life, and have not persisted as part of the consciousness, nor can they be recalled from the fore-consciousness [1] by an effort of memory. They have become part of the unconscious, from which

[1] Conceptions which are not in the immediate field of consciousness, but which may be called into activity by one's own mental effort, are classified as 'fore-conscious.' Fore-conscious ideas may be recalled into consciousness again and again, but 'unconscious' conceptions and ideas may only become 'conscious' through the medium of psycho-analysis or hypnosis.

they can only be recalled by psycho-analytical processes or hypnosis.

Conceptions, ideas, tendencies flock through the consciousness: the great majority pass into oblivion. There are two ways in which this 'forgetting' may occur. The mental energy involved in the formulation of an idea, in the direction of a tendency, in assimilation of a conception, cannot be dissipated or annihilated: it may be transmuted—'sublimated'—into other forms of expression; that is a wholesome process of 'forgetting': or it may be suppressed—'repressed'—into the unconscious, there to act somewhat in the nature of a foreign body, and to form a basis for some neurotic or perverted condition; that constitutes an unwholesome process of forgetting. In the normal healthy mental life, a painful impression finds immediate coequal expression in a different form: take as an instance, on receiving a blow, one retaliates either verbally or physically, or, by strong association of moral ideas which will overcome the feelings of resentment, obtain that frame of mind which will lead one to 'turn the other cheek.' In other cases, dependent upon the nature of the individual, upon the type of emotion concerned, upon social restriction, and upon various other conditions, the effect of the painful impression received is not expressed in natural outlet, but is repressed into the unconscious, therein to remain irritant to the psyche, ultimately to break out as an hysteria or other form of psycho-neurosis. Such repressions may take place in childhood, youthhood, or adulthood: in point of view of understanding the conditions of child-life, it is well to realise that many later abnormal conditions are to be traced back to some early ex-

perience of 'shock,' frequently of a sexual association, which has occurred in childhood or even in infancy.[1]

Then again, in the normal child, this subconscious sexual life, the existence of which Freud is leading us to appreciate, may, by careless fostering or ignorant stimulation, be increased to precocity. This is specially so in the very early years: then comes a period of latent sex, which is much less liable to misfortune and which lasts till the approach of puberty. These prepubescent years during which the senses are alert, the memory quick and sure, the body and the mind are both in a placid state of regular development, are by their very characteristics admirably fitted as an approach to the stage of puberty, at the beginning of which the whole being comes under a reign of change and upheaval. The physical changes which announce the onset of puberty are, in themselves, bound to exercise a profound influence upon the mental life, an influence which may be disastrously perverted through lack of understanding of the part played by these organic happenings. But this is not the only critical expansion of mental and emotional experience. Co-ordinate with the expression of functional activity of the racial organs is the awakening of the racial instinct, the all-potent impulse implanted by Nature in all mature creatures. which, through the pleasure it brings in its train, is to secure that her races die not. Reproduction is essentially costly to the organism, sometimes even to death; its performance is fraught with many dangers; and were it not for the irresistible impulse which drives the

[1] See McDougall's *Psychology* (Home University Library, published by Williams & Norgate), chap. vii., for a short account of Freud's work.

sexes to take interest in one another, and to co-operate in the fulfilment of their racial function, were the possibility of this co-operation left to the merest chance, the animal kingdom would be very small in numbers, and composed of the least highly evolved types. Evolution is all-pervasive ; it has effected not only the present physical condition of all types, but the mentality, the emotional status also : as the physical sex organisation has proceeded along lines of progress, so has the sex impulse evolved, till in Man we have, of each, the most refined elaboration.

The beginning of puberty sees, then, the transition of the sex-life from the subconscious and latent condition to the plane of consciousness. Its first steps in this new phase are not at first very definite and forceful, though in the boy there is usually a more vigorous psychic disturbance than in the girl. This is, of course, to be expected as a preface to the more powerfully direct nature of the racial instinct in the male : this instinct is diffused through various streams of expression in the female organism, for the part played in procreation by the female, as we have already seen, biologically makes more extensive demands upon her organic structure, and, consequently, psychologically tends to a diffusion of the racial instinct in the female, in contrast to the concentration of that instinct in the male. And if we consider this principle in relation to the most highly evolved type, the human species, we find it applicable ; biologically the male contribution to the formation of a new being is made in a single act ; in the female, the biologic responsibility lasts for a long period of many months, during which the new life receives antenatal and postnatal care. So the

tendency is for the racial instinct in man to be concentrated towards the fulfilment of that act, and for that instinct in woman to be more widely expressed, to find a considerable part of its expression in the love of children and the desire for motherhood.

The first stirrings of the racial instinct pulsate but slowly and gently, gathering strength and influence as the early years of youthhood pass. 'Sex hunger' begins to enter into the desires of our boys and girls: we find the boy beginning to take an interest, perhaps shyly and from afar-off, in girls; beginning, too, to take an interest in his personal appearance, and beginning to offer willingly the courtesies which before have appeared more as a duty. And girls, during these years which see incipient expression of the racial instinct—somewhat earlier in girls than boys—become conscious of sex attraction, begin to wield a sway. Each sex, in short, is beginning to be aware of and critical of the secondary sexual qualities of the other, an awareness and a criticism which becomes stronger and more potent as adolescence proceeds.

The awakening of the sexual life, accompanied as it is by poignant physical change and by new emotional experiences and interests, is a period fraught with many dangers — a period liable to inoculation from many sources of both a physical and a mental nature. It may see the beginnings, if there is any tendency inborn, of both physical and mental weakness, so critical is the intense instability of its balance, which instability, Sir James Crichton-Browne tells us, girls are inclined to suffer from more than boys.

The mental life undergoes many changes, more or less gradually. The awakening of the sex impulse

institutes a whole new mental outlook. Hitherto the child has been characteristically self-centred, but now a new curiosity dawns: he begins to investigate his equation with his environment, and finds himself launched into a world of new relationships; he realises himself as a personality, and discovers himself as a member of society, a social unit with social obligations to fulfil and reacting to social affects. Reason, which has been comparatively embryonic, now begins to unfold freely: mental development has yielded to a great stimulus. New interests assert their claim; new ways of looking at things present themselves. What he was accustomed to accepting blindly he now begins to question, so that a reasoning basis for moral conduct begins to impregnate the mentality. Religious doubts and fears arise; many adolescents of keen independent thought go through a period of agnosticism, no doubt due to their new dawning appreciation of the psychic world and their inability to adjust this new influx to the more or less concrete conception of religion of which their childish ideas consisted. This power of independence in the thinking life augurs well for future mental expression; the adolescent who possesses it will be capable of making a mark, securing an independent line of thought or action for himself in later life, but its early manifestation is often of a type unattractive or to be deplored. Such adolescents often pass through a self-assertive stage, glory in unconventionality, thoughtlessly tread upon people's toes, and overestimate the importance of their own sayings and doings. It is a form of mental vigour which will, if not unwisely fostered, undergo transmutation as the years succeed one another, and become power.

Primarily, adolescence is a problem of emotional change. Imagination stirs in a wonderful way, carrying the adolescent far from the egoistic centre of childhood. The heart throbs with new joys. Nature unlocks her treasures to the now-seeing eye. A wealth of sentiment, rarely expressed (for the adolescent is slow to speak of deep feelings), floods the mind and brings it into communion with Nature. The beautiful in Art, the inspiring in Literature, the soul-lifting in Music, the heroic in Man—all alike may leave their impress upon the sensitised psyche—sensitised, alas! not only to whatsoever be lovely and of good report, but to that which may be unholy and soul-destroying. We recognise two types of imaginative activity: the type which expresses itself with a definite object in view, which is purposive or productive, such type of activity as is involved in the creation of a design, the planning of a tale, or the painting of a picture; and the type which is less purposive, more passive, freely wandering amid the scenes and thoughts of memory, making odd connections between present and past, giving weird or delightful embellishments to persons of fact or imagery, weaving conversations, journeying into new and far country. This latter type of imagination is often called 'fancy,' and though less purposive than productive imagination, plays a not less valuable part in the making of the character. Childish imagination runs riot in the land of fairy-tales, particularly during the seventh and eighth years. Later childhood casts fairy fancies aside, and adolescence yields to the fascination of romance, of travel, and of adventure, and bows the knee in hero-worship. Expansion of the emotional life has largely come through the intensifying of the imagination.

This power of imagination working with and through the emotions, through æsthetic sensitiveness, through unfolding sentiment, and through an enlarged conception of humanity, is a factor in adolescent development which we, realising how much it will aid towards instillation of ideals for life-guidance, must appreciate as of profound importance. I am inclined to think that this power of imagination is at the bottom of much of the sentimentalism which young adolescents feel and sometimes express. The growth of juvenile love is one of the most interesting and one of the most important problems of our theme. We must recognise it and understand it.

The age at which fairy-tales were believed in has passed; the spirit of romance has been resting temporarily during the later years of childhood, but springs into vigorous life again, in a new relation, as the end of childhood is reached. In the fairy-tale days the child was perfectly satisfied to weave romances around the fairy prince and fairy princess, the ogre, the giant, and "all the king's horses and all the king's men." The personal element obtruded itself but little beyond admonishment—"and the goblins 'ull git yer, ef yer don't watch out!" Towards the end of childhood, however, a new note—the personal—is sounded. Romantic fancies no longer play round impossible fairy people, but round fictitious possible people, or around imaginary doings and sayings of known people—people who are, according to the fancy, in some more or less personal touch with the day-dreamer, who is no longer a mental spectator, but is in the drama. To the very juvenile mind the hero of dreams is superlative in all the virtues—immaculate in body, soul, and dress; to

the fourteen-year-old girl he is still superlative, and immaculate, and possessed of unlimited wealth—a slightly practical note ; to sixteen, he is fine, handsome, capable of doing the right thing at the right moment, has wealth enough for all demands that may be made upon him, perfectly groomed and tailored, with many virtues, and a great power of loving and being loved—a slightly more practical and possible young man ; towards the end of adolescence he has probably left the realm of romance and become an actuality—an ordinary man, probably plain, stronger than she, more or less up-to-date in dress, with worldly possessions enough to meet the demands of matrimony, loving and loved—a perfectly practical and commonplace hero. The power of romance dieth not. Happy are the natures that see a halo round mediocrity !

It is Love, in all its refinement and beauty, which lifts Man to his high plane in the kingdom of living things ; he has the power of conscious selection, of choice, the crux of psychic evolution ; those lower than he are guided blindly by instinct alone, by physical passion only ; and if he neglects, degrades, or evades his grand psychic climax he will become as those lower than he. And, as he has toiled up the evolutionary ladder of physical life, and can look back to recognise in his own growth some of the steps up which his race has clambered, so also has he climbed an evolutionary ladder of psychic life, and may, looking back, identify many of the steps his race has made. He can see in the silken nest in which the female spider harbours her eggs, in the precision with which the female newt places each egg under a leaf of Starwort, in the care which the bird lavishes on her eggs and nestlings, in the long-suffering

tenderness with which the cat feeds and trains her kittens—in all he can see the evolution of mother-love, to know that it has reached its climax in his own mother. If his insight is keen and pure he will read aright the message in the song of the birds at spring-time, in the croaking of the frogs, in the perfume with which some of the butterflies attract their mates, in the 'courtship dance' of the spider, in the growth of the crest in newts, in the restlessness of the salmon ready to begin its journey up the river to the quiet shallows where the eggs may be laid and fertilised; and he will know that it is all one grand song of love which, finding its melody in single notes and simple theme in those lower than he, breaks out in rich complexity of chord and harmony in his own life-love. The first notes of juvenile love sound faintly, tremulously, and are strangely reminiscent of the early notes sounded in the racial theme. They soon gather strength and coherence—may develop into a life-inspiring melody, may perhaps become a crude and coarse jingle. It greatly depends upon nurture as to which way the balance will go; in some natures the direction is quickly decided, and adolescence sees little or no change in type, merely intensification of the direction of juvenile love; in other natures, the whole of youthhood is a scene of constant change; the years see first one phase of love-manifestation, then another; shyness followed by forwardness; response to beauty's appeal supplanted by response to the psychic appeal; forwardness may give place to aloofness; high ideals may pass away, crushed by unfortunate experience or starved through lack of sustenance; out of crudeness, ignorance, misfortune, sentimentalism, a high ideal may arise—so great are the possibilities of variation.

Acts and expressions of adolescents may or may not be prophets of their maturity. As regards their thoughts and behaviour in early love-affairs, I am strongly inclined to think that imagination and imitativeness are responsible for much of modern adolescent thinking and behaviour in regard to love. Girls read novels, tales in which the love-note is predominant, admire the heroine, accept her notions, and when circumstance presents an opportunity which may be regarded as a test of their own conduct, they behave as their much-admired heroine would have done. It is very much a question of temperament as to which type of heroine will be preferred and copied! This stimulation of the love-interest through reading may produce a fictitious growth of the emotional filament, which can only be labelled 'sentimentalism': this it is, which leads the boy to cut off and treasure—perhaps for a day, a week, not a year—a bit of his schoolgirl sweetheart's hair, which leads a girl to tie up his grubby notes in blue ribbon. Such acts are not acts of fetishism or incipient perversion: they are merely performed under a sentimental appeal. It is a phase that will pass. Sentiment will oust sentimentalism; as the stream of time carries away the lighter dross, the gold will remain; the adolescent, nearly mature, will know it has remained. Proneness to introspection is often typical of adolescence: this liability may be a vast aid to mental self-adjustment, in a normal healthy mind, but where the general mental, moral, and physical entourage is not such as may contribute a healthy stimulating reaction, this tendency to introspection may lead to a morbidity and moodiness of disposition. Such a tendency, however, may be circumvented, for the

adolescent mind is quick to respond to outside interests ; with great avidity it seizes new topics, generously it yields to new claims upon its attention. Philanthropy and social work often exercise a charm, it may be through emotional appeal to the sympathies so easily roused, or it may be because the acute activities are afforded an opportunity for self-expression ; perhaps also some satisfaction to the sense of self-importance enters in ; probably it is due to a combination of all three main factors and others contributory.

Youthhood, too, is the time of hobbies and the time of keen ardour in games. The games interest may persist, the hobbies may pass away—but each has served its purpose in providing an outlet for adolescent energy which, had it not been allowed a ready outlet, would have dammed up and perverted the stream. We must remember, referring to the earlier remarks on Freud's work, that much of this unbounded energy of youth is sublimated sex energy, and if anything interferes with normal sublimation, an unhealthiness of mind is more than likely to creep in. In fact, it is most important that girls and boys should have full opportunity for sublimation of sex energy, a point which should be fully borne in mind in connection with education of youthhood. The management and control of the sex impulse constitutes the prime problem of adolescence, the great solution of which lies in sublimation.

In connection with the sex emotions, as in all that has been said regarding the psychological aspects of development, we have to remember that tremendous variability may characterise individual cases. The temperamental factor is widely variable. One can only indicate the lines upon which average development

takes place and draw attention to the wide range of possible variation.

And so it is with the sex emotions. I am not now dealing with the more psychic aspects of sex attraction, of sex hunger, but with the more purely physical sensations localised in the zone of the racial organs. It has already been indicated that in boys these sensations are more acute and specific than in girls : though here, again, no absolutely hard-and-fast rule applies. There are boys who experience but little physical sex feeling ; there are girls who experience much, although the contrary is the more general rule. In order to understand how it may be that control of the sex emotions presents more or less difficulty, let us refer again to the racial organs. These are all richly supplied with nerves, afferent and efferent, so that they come directly under the dominion of the brain and nervous system, and also in their turn may react upon the brain and nervous system. A very close inter-relation exists between the reproductive and the nervous systems, as it also exists between the other organic systems and the nervous system. No one system of the body can work in isolation ; each reacts, more or less, to the condition of the others. Then, too, we are aware of some very curious organic responses. Take, for example, the case of a person who suddenly sees something terrifying. His heart stops beating for a second or more, then palpitates rapidly, the circulatory action being temporarily, through nervous reaction, thrown out of rhythm. Again, a particularly nauseous sight presents itself, and he who sees it cannot eat, cannot swallow food for the time being—a temporary inhibition due to the close inter-relation between the nervous and digestive

systems. Disorders of the digestive system, imposing a condition of malnutrition, lead to disorders of the nervous, skeletal, muscular, and epidermal systems. All these examples are matters of common knowledge, and serve to make clear how close is the harmony of working relationship between the various organic systems and how easily disharmony may be brought about.

To consider the action of the racial system in the light of these facts, and particularly to understand how the sexual emotions may be stimulated, let us remember that the sperm-producing and ovum-producing organs are glands; they may be regarded as coming under the heading of 'emotional glands.' The lachrymal ('tear') glands of the eye constantly secrete from the blood a small amount of fluid which keeps the eyeball, the lining of the eyelids and of the nose in a moist condition. By a variety of stimuli—it may be something seen, something heard, something smelt, or by physical pain—these glands are accelerated in activity, and the fluid overflows—tears. In a similar way, the salivary glands of the mouth may be regarded as emotional glands: it does not need the taste of a lemon to make the saliva overflow, the sight of one or the sound or thought of the word 'lemon' is often enough to stimulate. The perspiration glands of the skin provide yet another example: through fright or anxiety their action is often rendered abnormal. And so it is with the sexual glands. It may be something seen—a picture; it may be something heard—a suggestive joke; it may be something felt—a handclasp or a kiss; or even a perfume may be the stimulus which promotes response in the sexual glands and their adjacent organs.

So it comes to be that the adolescent who may have a strongly sexual nature, or who may not have had environmental aid in achieving thorough sublimation, may have many difficulties in exercising sex control. And through the endless chain of organic relationships, weakness or disorder in the racial and the nervous systems will be liable mutually to react.

An understanding of these psycho-physical dependencies should prove a help not only in providing a rational basis for education of adolescents, but in leading us to realise the importance of laying an early foundation of habit-life—a foundation which should begin to be laid in infancy; indeed, the ground may be prepared for it even before birth, for it must be remembered that a child with a strongly sexual or precocious tendency has often to thank its parents for its endowment.

In order, however, that we may help adolescents through their periods of difficulty, in order that we may provide an education which shall be beneficial, strengthening, and shall aid in sublimation, we need to understand, in addition to the phenomena of psycho-sexual life, the general lay of the land during adolescence; we need to grasp the main characteristics of youthhood (so many of us forget what we have been!), and to enter sympathetically into the psychological condition of adolescent life, so that though we may know where the pitfalls lie, we may also know how to make provision against falling into them, and how to achieve the happiest circumvention.

Mental activity is very great during adolescence, very easily stimulated, exceedingly responsive. Hence, we find a great readiness to interest in outside matters, often a spontaneity of interest, which provides a valuable means of effecting sublimation, and also of avoiding

the development of the introspective habit. A liability to introspection is frequently characteristic of youthhood, particularly of youthhood insufficiently occupied or unhealthy—a point to which we will return in the next chapter. It is largely a question of temperament as to how far the introspective habit may predominate in adolescence, but as William McDougall points out, temperament, though a complex of many factors, is largely a matter of bodily constitution: the great bodily organs exert potent influences on the mental life: there can be no divorce of bodily from mental life; the health of the one is intimately bound up in the health of the other. The equation between the two is not absolute; if it were so, we should be unconscious of temperamental differentiation of persons; but because the equatorial values vary in different persons, we recognise this variation and call it temperament.

In conclusion, let us realise that adolescence is the great formative time of life. The child comes into the world already endowed by heredity, receiving from its ancestors the gifts of traits, good, bad, and indifferent, each and all of which will develop in encouraging environment. Many of these traits may demonstrate their existence very early in life; others are delayed in their manifestation. Deprived of environmental support and stimulus, a characteristic will be unlikely to survive, or able to express itself in full potency. Adolescence is the determinative period: inherent characters brought out then or earlier, encouraged, strengthened, then fix themselves as permanencies in the physical or mental make-up of the individual: likewise, inherent characters discouraged and inhibited during these formative years tend to weaken, and

ultimately may die out. A healthy, happy, well-balanced, and well-conditioned maturity is largely, if not wholly, the outcome of a well-nurtured (it may be fortuitously so) adolescence.

"Our times are in His hand
Who saith, 'A whole I planned,
Youth shows but half; trust God: see all nor be afraid!'
. . . . . .
What entered into thee,
That was, is, and shall be:
Time's wheel runs back or stops: Potter and clay endure.

He fixed thee 'mid this dance
Of plastic circumstance
This Present, thou, forsooth, wouldst fain arrest:
Machinery just meant
To give thy soul its bent,
Try thee and turn thee forth, sufficiently impressed."[1]

[1] "Rabbi Ben Ezra," R. B. Browning.

CHAPTER IV

Care of Children

In the two foregoing chapters we have become acquainted with the growth of the body and the growth of the mind; we have seen the various stages which form special punctuations in the graph of life's curve, and should, with this knowledge, be ready to face the question of supervision of child-life in a rational and comprehending way, having confidence in ourselves that we know just why we pursue certain courses of action and give certain directive influence to conduct and thought. So much may be done indirectly to ensure right ways of sex behaviour and right attitude of mind towards the sex life; so much may be done indirectly to ensure success in meeting the many temptations which may assail in later life, or to ensure that those circumstances which to an individual, unaided by careful nurture, would present temptation, shall be voided of their seductive power; so much may be done indirectly to train the thoughts towards that which is highest and best, to direct the energies towards that which is rightly expressive and nobly undertaken; that a great call is heard for those who have the lives of children in their charge to understand how to care for them and train them in the wisest and in the rightly sympathetic way.

An upright manhood, an upright womanhood, are not attainments of mushroom growth; they are the product of all the years that lie behind, the foundation, indeed, often being laid in infancy and little-childhood. Habits learnt in early life are difficult to eradicate; they tend to exercise a profound influence over the later life, often persisting to the end of life: hence it is of supreme importance that these foundations of early habit-life be rightly laid, that there may be no omission or commission here which may be held responsible for failure of later training or teaching. The sex functions are one department only of the bodily organisation, albeit a most important department for us to consider; perfect bodily functioning is that condition in which no one system enforces itself predominantly upon the consciousness, but that all are working together in harmonious relationship. So we must, in order to supervise child-life intelligently, give careful attention to the development of healthy physical habits, ignoring no aspect of this physical question. Good training in infancy and early childhood in connection with bodily functions helps not only in the promotion of physical health, but makes for the promotion of healthy attitude of mind towards all that the body may have to perform.

A well-balanced mind in a well-balanced body constitutes the ideal condition, whatever be the state of life through which the individual may be passing. Every conservation of nervous energy, every assurance of physical well-being, therefore, is essential to this condition, and must be provided for during the whole of life.

The very little child, the infant, in some cases, may,

through accidental discovery of the nervous response to stimulation of the racial organs, become aware of the pleasurable sensations arising in this region, and may be led to repeat the actions which give rise to them, in this way forming a habit, in absolute ignorance and unconsciousness of its bearing, which may seriously affect its later life. This habit of 'self-abuse' or 'masturbation,' as it is usually designated, may, as is already indicated, arise in infancy, and may persist for many years, if not throughout life. It will be remembered that the genital zone is exceedingly sensitive in nervous response and it must also be borne in mind how the infant learns by association of instinctive action and result: that which it performed once produced a certain result; repetition of the action produces similar result; and so on, till it comes in the slow processes of its consciousness to associate definitely action and result, and to act accordingly as to whether the result be pleasurable, gives satisfaction or not. And so it is that even a little child may be led to form an undesirable sex habit.

Of the conditions which may give rise to stimulation, the chief are those of an unhygienic nature. Lack of cleanliness in this part of the body, as in others, leads to accumulation of body secretions in the folds of skin: this accumulation tends to be of an irritant nature, and encourages friction to relieve the irritation. Every care to cleanse thoroughly, briskly, and gently, should form part of the daily programme of bathing, and as soon as the little boy—or girl, as the case may be—is capable of being taught to wash and bathe himself, he should be taught to give attention to these parts, just in as natural and as matter-of-fact manner as he

is taught to wash "all the little holes and corners" of eyes, ears, and nose. Till this time is reached, the mother should make such cleanliness of the racial organs and the parts adjacent to them a daily care; in the case of little boys who have not been circumcised,[1] it is necessary to draw back the fold of skin known as the 'foreskin' quickly and lightly, and cleanse the part thoroughly. It is most important that this habit of attending to the cleanliness of all parts of the body should be learnt very early in life, while the mind is ready to accept direction in a matter-of-fact way, and so to form good habits. If this detail of bodily attention is left to be introduced later in life, towards the end of childhood and later, there is more likelihood of directing a stimulative attention to the racial organs: this will be against the interests of their health, and against the hope of preserving a normal attitude towards the sex organs.

Unsuitable clothing may be the cause of irritation, by being too tight, or of rough material or dirty. Little boys' trousers should always be roomy, and should have soft, detachable, washable linings. Similar care should be taken in regard to the underclothing of little girls. In the case of poor, ill-clad children, in addition to these considerations, absence of adequate covering often renders the lower parts of the body very accessible to stimulation and irritation.

Other causes of local irritation may be more or less pathological (*e.g.* intestinal threadworms) and may

[1] Dr. Still in *Diseases of Childhood* is of the opinion that complete circumcision is inadvisable, tending to expose a highly sensitive area, but holds that partial removal of the foreskin only, is necessary as a preventive against accumulation of irritant matter.

necessitate medical advice, which should always be sought where simple measures do not result in a cure.

Self-abuse is most frequently practised in bed. The wise mother, therefore, in order that no untoward happening should be laid to the charge of her negligence, will help her little ones to form habits which will be preventive. It is wise to train children right from infancy to go to sleep with hands outside the coverlet or folded up on the low pillow, also to rest on the left side rather than on the back; to go to bed physically tired so that sleep follows at once, and to rise immediately on waking in the morning. It is most unwise to insist upon an active, alert child lying still in bed in the morning till the "getting-up bell rings." The habit of emptying the bladder prior to going to bed and again immediately on rising should be inculcated. Bedclothing, too, should be clean, light in weight and not stuffy or over-heating, the bedroom cool and well ventilated. Children should have single beds, or if, as the case may sometimes happen, household furnishing accommodation does not admit of this, as far as possible, children of the same age and same sex only should share beds.

A word of warning to parents, that they should be exceedingly careful in the choice of nurses to attend to their children, and that they should not, unwisely, leave their children in the care of unreliable servants. Medical information tells us that only too frequently are children mishandled by untrustworthy nurses and servants, who, in this way, endeavour to soothe a crying or troublesome charge.

In very young children physical habits are formed with great readiness and ease, much more so then than later in

life, when the establishment of a new habit involves more than mere implanting; the uprooting of an earlier-formed habit, the undoing of a more or less firmly fixed custom, may be necessary, and thus render reformation much more difficult of accomplishment than is formation. A little child should learn to perform all the bodily functions regularly, and to view in a right and proper spirit all to which this relates. In particular is the inculcation of a right attitude towards the excretory functions necessary, not only in the interests of health, but also in the interests of modesty and personal reticence. Neglect to regard this aspect of a child's training often leads to undesirable ways and confidences with other children later on, encouraging an irreverent and perhaps vulgar and immodest behaviour. It should be explained in a simple way to the little one that the body has much work to do, that it has to grow and has to be kept warm, and that food is taken to serve these purposes in the body. But that, just as in the case of the fire burning in the grate, there are parts that are not required—the smoke which passes up the chimney and the cinders left in the grate—so in our bodies there are parts which are not needed, when the work is done and the warmth obtained. If this unneeded material were to stay in the body, it would do a great deal of harm, and so wise provision has been made for these useless parts to come away. Little ones are amused at seeing the 'smoke' on a winter's day issuing from their nostrils and mouth. A wise and tactful mother can explain these facts to her little ones in simple words and phrases, and can, in her own gentle way, present this knowledge so that the child realises that the exercise of these and all bodily functions are

things that concern himself and those who are in charge of him only: not to be ashamed of them (for there is nothing in the body ever to be ashamed of—its wonderful perfection of functioning calls only for admiration), but to be reticent about them, so that a true modesty, not a false modesty, may develop.

Other habits may well find a rooting ground during these years of early childhood: a cold tub in the morning to promote vigour and nervous tone. Daily and frequent exercise is essential to healthy muscular and nervous development, and the desire for it, a natural expression of childhood, should be encouraged and fostered through all the years of growth, so that it becomes a necessity to the well-being and happiness of the adolescent, providing in those days quite naturally a mode of transmutation or sublimation of sex energy.

The question of self-control has a great bearing upon our problem, which will be dealt with more fully when we are considering the moral and ethical aspects of sex training. It is here relevant, however, to point out and impress the fact that self-control is no swift-grown product of later years: any power of self-mastery which the adult may possess, and the ease with which it may react to temptation, are the expression of power which has been long years in formulating itself. Even in the nursery may the seeds be sown: the little child may be taught that to desire is not always to receive; in fact, it should be trained towards small acts of self-denial, away from the paths of self-indulgence. Foerster[1] quotes most aptly the dictum of Joseph de Maistre: "Everything that hinders a man strengthens him.

[1] *Marriage and the Sex Problem*, Foerster, p. 176. Published by Wells, Gardner, Darton, & Co.

Many a man of thirty years of age is capable of successfully resisting the allurements of a beautiful woman because at the age of five or six he was taught voluntarily to give up a toy or sweet!" The importance of ascetic training is in danger of being undervalued, and is, at any rate, unappreciated by the over-fond parent or unwise nurse who would thoughtlessly indulge all the child's desires. It is not too soon to begin in the nursery to build up will-power which is to lead to absolute self-control; self-conquest in the great struggles of life is prepared for and rendered easier by the many little battles which have been fought and won earlier in the day. And so we see that it is not only for physical reasons that greediness and selfishness should be restrained, but such training is bound to have a very practical moral reaction.

Habits of independence may be learnt in these early years, that strong self-reliance may evolve. Perhaps we do not always realise the small beginnings of virtue and of vice, and that the small items of nursery days may be a considerable factor in character formation. The Montessori doctrine of self-education, with its dictum, "Do nothing for the child which he can possibly do for himself," [1] is full of suggestive power, and may, when we ponder over the possibilities of this scheme, induce us towards reform in the many customs surrounding and governing child-life. Is there any reason why we should continue to make children's clothes fasten up the back, so increasing their dependence, when if they fastened up the front the little ones might so easily be taught to do this thing for themselves? Particularly, one would urge, in regard to little girl-children, that

[1] Edmond Holmes in *A Montessori Mother*, by Dorothy Fisher.

habits of independence, resourcefulness, and self-reliance should be fostered.

Growing out of this idea is a side issue of suggestion : that in these early years also the child should be trained to regard his own toilet requisites as private to himself, and should never become accustomed to using those belonging to anyone else, so that as the years pass by he would no sooner think of using the towels provided for common use in public lavatories than he would think of using a public toothbrush.

One recognises, of course, that such training of young children makes great demands upon the time, the patience and the tact of those who undertake the work, and that many busy mothers may be strongly tempted to take the short-cut, and do the things themselves, instead of guiding the child along the slow and difficult path of self-education. But those who have the highest good of the little ones at heart will do their utmost to face and cope with the problems their efficient training presents, realising that their effort and patience will be rewarded, not only in the relief which such independence of help will ultimately bring, but in the assurance that they " have had the vision for a guide." [1]

The years of infancy and little-childhood are extremely impressionable, more so than is usually realised. When we were dealing with the psychological development of the child, it was pointed out how susceptible of impression these early years were, and that impressions then received were very liable to become ' repressed ' into the unconsciousness, there to remain and ultimately be the cause of some later condition of mental ill-health. Bearing this in mind, those who have the care

[1] Ethel Clifford, " Songs of Dreams " (*The Ship of Dreams*).

of little children before them will realise how imprudent and incautious many people are in regard to their doings and sayings in the presence of young children. Many adults are utterly careless in their conduct (*e.g.* in connection with exercise of the excretory functions) when little children are with them, little realising that the young ears are hearing, that the young eyes are seeing, and that the young consciousness is being impressed. The mind during these early years is very receptive, the memory very plastic : those things which do find a resting-place in the memory at this time fix themselves there with great certainty. How important it is, therefore, that nothing but good should have a chance to abide !

At some time during the nursery and later childhood period, children usually begin to ask questions concerning the origin of babies, and it is important that they should be told the truth—not necessarily the whole story of reproduction in detail, but their ingenuous, simply-put questions should be answered with equal simplicity and frankness, in language such as they can understand. The story of the transmission of life from one generation to another should gradually unfold itself to the growing intelligence, making its way imperceptibly into the child's knowledge of the things of life. How this may be achieved is a theme for another chapter. Here, in this consideration of supervision of child-life, we would point out the fact of these opportunities arising, urge the need for their recognition, in order that the mother, whose joy and privilege it is to be the great guide, should realise how early her opportunities in this direction begin. The first questions which the little ones frame are naïve, innocent, generally more or

less pertinent to some happening—the arrival of a new baby in the family, or of new additions to the farmyard stock—or perhaps they show the beginnings of wonder as to their own origin—" Where was I before I was here ? "

Whatever may be her guide, the wise mother will recognise it, and will seize the chance which a foresighted Nature, implanting this curiosity about the origin of life thus early, offers her. For it is infinitely better that the main facts involved in parenthood should be learnt early rather than late—before ten years of age—very often earlier. Childish curiosity concerning these and other things varies greatly in degree and in rate of development: another reason for drawing attention to the mother's privilege, in order that each mother should be ready to help her own children to plant their feet firmly, although the first steps be tentative and slow, upon the shores of knowledge. If she allows these opportunities to pass by, unappreciated, her chance is probably gone; for this curiosity which children show is perfectly natural and healthy, and, moreover, is invincible, and if its claims are not satisfied rapidly, legitimately, and progressively by the one in whom all trust should be reposed, the child will be driven to seek the information from other sources—sources often wholly undesirable, often vulgar and pernicious, at any rate less valuable and wholesome than the mother's loving instruction could provide.

As the years of childhood pass, youthhood draws nigh; the transition from the one epoch to the other is a difficult period, one which, accompanied as it is by evidences of physical change, the boy and girl should not be allowed to meet unprepared. Many girls, being

totally unprepared for the onset of menstruation, experience severe nervous shock (this at a time when their nervous system is least likely to withstand a shock), and adopt various unhygienic measures to stop the flow, in some cases, in their ignorance, bringing about then, or later, ill-health of a more or less serious nature. Even girls who do know what to expect are often without knowledge of the care they should take or the measures they should adopt to secure the proper establishment of this new bodily function, which, through lack of understanding its great significance, is often regarded in an irreverent and wrong light. There are many questions which a girl has to settle for herself during these early years of puberal change—questions of health, of bodily care, of occupation, and so forth, and she should not be deprived of the counsel and sympathy which would make the transition easier.

Boys, too, often stand in need of help and guidance. The transition period in boys is longer and less intensive than in girls, and the physical and psychical experiences are less definitely periodic. But boys, experiencing their first seminal emissions and violent dreams, are frequently, through lack of a wise counsellor, driven to confide in companions or to seek aid from quacks, thereby being led to believe themselves in a condition of ill-health instead of being led to realise that they are merely passing through a rather trying time in a perfectly normal development.

If, therefore, parents or other adults responsible for the way in which the lives of boys and girls under their care develop, are to have that frankness of relation with them, and are to instil that confidence in their minds which shall facilitate approach to this subject

of puberal change, it is most important that the early instruction concerning parenthood should have already been given. Experience shows that those children who are instructed early, before ten or twelve years of age, receive this information in a healthy, matter-of-fact way; while those who are first informed at, or just before, puberty tend to brood over the knowledge that comes to them, to be depressed or morbid; and when one realises the general condition of disturbed psychic and physical nature at this time, one can understand how this morbidness may arise.

The occurrence of the first menstrual flow in girls and the first seminal emission in boys is often accepted as the indication that puberal change has set in, but, as has already been explained, the inner physiological workings concerned with the coming into functional activity of the racial organs have begun much earlier, bringing about many conditions by which the approach of puberty may be recognised. Some of the signs are physical, others of a psychological nature.

The girl begins to drop some of her tomboyish ways, to be shy and reserved, perhaps in some cases alternating this with a curious forwardness in behaviour. She is often overcome by fits of depression of unaccountable origin. She may be moody, gay, intensely emotional, and intensely religious by turns; is frequently irritable and difficult to understand. Often she is easily tired, and may suffer from so-called 'growing pains,' and show a tendency to 'outgrow her strength.' The specific changes in bodily form which were outlined in an earlier chapter begin to show themselves; a temporary disordered condition of the complexion sometimes occurs, generally to pass away in a year or so, perhaps

less. Some girls pass through this transitional stage with little or no apparent dislocation of their ways, thoughts, and physical condition; others suffer more or less in the directions outlined above. In any case, this period of growth is one which calls for special care —not necessarily obtrusive supervision, which may lead to oppressive coddling, but for a watchfulness and understanding which will be ready to detect any signs of incoming weakness, and ready to supply the necessary corrective and preventive nurture.

The first appearance of menstrual flow may be slight, and its recurrence is not always regularly periodic during the first year. Girls should be instructed in the necessary personal hygiene (see Appendix), and given advice on the way of living at that time. They should be led to understand the intrinsic significance of the change, and from that to regard it in a reverent way, and to realise the importance of not imposing undue strain upon themselves, mentally or physically, during the few days when rest is an aid towards perfection of health. Not that it is necessary or advisable (in normal cases) to rest to the extent of staying in bed during the period; that is likely to lead to an unhealthy condition of coddling and weakened self-reliance, for in spite of the disorders which so frequently afflict girls at this time, one has to recognise that the function of menstruation is a normal phenomenon, and should take place without any discomfort or disability; in fact, some authorities are inclined to view the phenomenon in the light of physiological condition, holding that, the body being in a condition of anabolism (*i.e.* is in a condition to construct tissue and produce energy more than is required by the immediate needs of the individual), a woman

should be capable of the best of achievement at this time ; and that, though one does not find the majority of women in this happy state of perfect health, the various ills which so often accompany the periodic functioning are to be attributed to the cumulative effect of generations of ill-advised custom in clothing and habits.

A girl, then, should be ready to lead a less strenuous life at this time, to forego violent physical exercise —hockey, tennis, swimming, and so forth—for a few days ; not to take very long and tiring walks, but a gentle, short walk is often beneficial and stimulative. She should in no way be encouraged to regard herself as an invalid ; nothing is more debilitating than that such a view of the case should be allowed to dominate. She should simply know that in the interests of her perfect development towards a happy and healthy womanhood, she should make no extreme demands upon her physique and mentality. If care is taken to establish the function well and healthily during the first two years, little trouble is likely to develop in later years. This is a point to bear in mind, for so often girls suffer little or no inconvenience during the first years of puberal development, and so often they are inclined to over-exert themselves (in their shyness) for the sake of keeping up appearances, that they impose no restriction upon their activities, and so sow the seeds of weakness which leads to the greater suffering of early womanhood.

The foregoing applies, of course, to normal development. Girls who are inclined to be weakly, to grow rapidly, and to show various conditions of ill-health or debility, will need more careful management, often based upon medical advice, to see them safely through ;

for, as has already been pointed out, this period is one fraught with many dangers, and it is likely to see the outbreak of any inherent weakness.

Girls who are living at home need not be troubled with advice on the management of their health till the time arrives for its application, provided that they are wisely forewarned that this time will arrive; but the young girl going away from home, to boarding-school, should not be allowed to face possible precocious happening without being forewarned, and advised as to measures to adopt. All this may be done wisely and well by the mother who understands her daughter and who appreciates the importance of health, desiring her happiness in everything. The young girl who is indebted, therefore, to such careful mother-love will be little likely to regard the function in a wrong light or to make it the subject of free and undesirable conversation.

Much of what has been said about the general conditions of body and mind associated with the dawn of puberty in girls applies also to boys, for the cause—the coming into function of the racial organs—is biologically the same. In a boy, the approach of this time is revealed by the 'breaking' of the voice, and about this time he is likely to experience his first involuntary emission and violent dreams. It is important that he should know that these emissions are likely to begin to occur when he is about thirteen or fourteen years of age, and that he should also know their import, that they are the first stages towards a vigorous and healthy manhood, and that they are perfectly natural, being just a normal overflow of semen which is not required in the body. They occur normally once a

week or once a fortnight, generally during sleep, and will periodically occur also during youthhood and manhood; they are accompanied by strange, acute sensations in the racial organs.

At this time boys often grow very rapidly and are, like girls, inclined to outgrow their strength. They need plenty of sleep, fresh air, good, wholesome, unstimulating diet, loose, warm clothing, light in weight, regular physical exercise and games, and definite mental occupation; but if there is any tendency towards physical or mental weakness, and if conditions of ill-health, of general unfitness to meet the ordinary demands of everyday life, are evident, medical advice sought in such cases will often be to the advisability of lessening mental strain (removing the boy from school or relieving him from home-work) and of increasing the amount of outdoor life and occupation.

It is quite possible, indeed usual, according to the experience of those who endeavour to instruct their boys and girls in these matters concerning their health, that each sex usually asks questions concerning the other—a thoroughly natural interest for an intelligent girl or boy to take. So opportunity arises for simple information concerning the other sex to be given, so that in boys a more sympathetic and appreciative attitude towards womankind and maternity may develop, and in girls the way may be prepared for an understanding of the trials which the grand gift of sex may impose upon mankind.

These years of puberal change, because of the very sensitive condition of the racial organs, and of the physical occurrences which naturally tend to focus attention on those parts, and also because of the general

incoming sensitiveness of the whole nervous system, are liable to be the starting-point of the habit of self-abuse, if indeed it has not been learnt earlier in life. In some cases the discovery may be due to some accidental condition of irritation; in others, children learn from one another: young boys are often misled by older ones into this and other undesirable sex habits—a great reason for supervising carefully the friendships of little boys. Older boys do not naturally find pleasure or intelligent satisfaction in the companionship of those much younger, and one may be warned to investigate, tactfully, the nature of any such friendship. With girls such a friendship between an older and younger girl need not be considered as suspect in absence of any definite reason for suspicion, for the natural expressiveness of the maternal instinct often leads older girls to 'mother' young ones, this being, of course, quite distinct from the foolish affectations of sentimentalism—'*Schwärmerei*,' as our German neighbours, in whose schools they are so very prevalent, name them—that are so frequently the distress and anxiety of the schoolmistress.

Masturbation is very prevalent; it passes through schools in waves: at one period a school may be entirely free from trouble, at other times permeated by it. Often the whole of the infection may be traced to one instigator. This is more to be found in boarding-schools where so many members of one sex are herded together in conditions opposed to nature's dictates; one is inclined to realise the development of masturbation as being a possible perversion of sex instinct which is denied a normal diffusive outlet in society and companionship of the other sex.

Teachers should therefore be warned to supervise the friendships of their pupils and to be ready to take preventive measures against the possible development of undesirable sex practices; supervision of lavatories and water-closets, of dormitories and bedrooms is a wise preventive measure to adopt. Single beds should be the rule.

Self-abuse is most frequently practised in bed, but also may occur during the day: many devices, such as pressing up against furniture, sitting cross-legged and swaying rhythmically, contracting the thigh muscles, passing the hand into the trouser pocket, sitting on one foot, and so on, may be employed for producing stimulation. But the majority of these may be circumvented by the establishment of good rules for class and home discipline, *e.g. any* deviation from a good sitting or standing posture should be immediately corrected. Little children in the infants' classes, the kindergarten, and preparatory schools should always be taught to rest the hands on the desk (in sight, therefore, of the teacher) when they are not otherwise employed in legitimate school occupation. Immediate distraction, too, is often a helpful corrective; a child behaving unhealthily should be asked to run some little errand, or to undertake a piece of work which involves change of position and demands its whole attention, and in this way a perfectly unobtrusive, yet withal successful, correction may be made. Lessons, particularly in the lower classes of the school, should not involve a long period of sitting still, for the muscular and nervous fatigue, which so set in, have often a detrimental effect on the habit-life. Prevention is better than cure; much may be done by an intelligent understanding of

these aspects of child-life to make for prevention. General hygienic rules of life should be followed: light, unstimulating diet—some authorities recommend that no meat should be taken after midday; clothing should be loose, light in weight, clean, and though warm, not of the type to produce overheating—the same applies to bedding; plenty of fresh air, night and day; regularity of exercise and employment; healthy occupation of interests; complete bodily cleanliness; cold water baths; no means of luxurious or sensuous living.

And when the question of *cure* has to be faced, the same general rules of healthy living aid. One has to remember that the great majority of children who may do this thing have absolutely no idea that they are doing anything that is wrong; any shame which they may feel about its practice is, in all probability, due to their mental association of ideas, having a wrong way of viewing the excretory functions of the body. Punishment, therefore, should never be resorted to as a means of cure; it simply leads to further concealment and deception; in particular, corporal punishment should be avoided; it is directly harmful and provocative of further stimulation. There are many arguments against corporal punishment, and not the least important, although the least mentioned, is this, the unhealthily stimulative effect it may produce.

There are no absolutely definite symptoms which indicate that the child or adolescent may be addicted to the habit, though there are symptoms which, in the absence of any other known causative factor, may be indicative, and may lead the parent or teacher to be alert in watching the habits of children they are anxious

about. Certain symptoms do often accompany the practice: redness of the eyelids, lassitude, chlorosis, and anæmia, inability to concentrate, cold, clammy hands, dry skin which often splits round the base of the nails, various symptoms of nervous overstrain, indigestion, a secretive look about the eyes, a desire for solitariness and inactivity; at the same time, it is perfectly evident that each of the above conditions may be due to some entirely different cause of ill-health; and, moreover, there are many cases of its practice where the child or adolescent is to all appearances absolutely muscularly strong and mentally and physically healthy. So that it will be seen that actual observation of and confession of the practice are the only real foundation one has to go upon. Observation may give one confidence to question the child whose ways cause anxiety; at the same time, one must be warned that habits of secretiveness and untruthfulness often follow in train, making it difficult to get at the truth; and, moreover, such questioning must be carried out with the greatest care, tact, and sympathy, otherwise injudicious questioning might stimulate the very consciousness one would wish to avoid. To obtain a cure, in addition to the provision of hygienic conditions of life, the parent (or responsible parent-substitute) should talk privately to the child, explaining the nature of the wrong-doing. To those readers who have grasped the part played by the racial organs, and who understand the rôle of the internal secretions, it should prove a simple task to present these facts in simple, well-chosen language, and to show that any over-stimulation of the racial organs is likely to cause wastage of that energising fluid—the internal secretion of the racial organs. The

function of this secretion is, as we have already seen, threefold: to stimulate the development of latent secondary sexual characters both physical and mental, to nourish the sexual glands, to stimulate the nervous zone of the racial glands. If, therefore, an undue demand upon the internal secretion is made in the direction of nervous stimulation of the genital zone (as in self-abuse) the other destinations of the internal secretion are likely to be ineffectively accomplished. In healthy boys and men, a natural emission of semen occurs whenever there is a surplus beyond the bodily requirements, and an unnatural emission such as is brought about by masturbation is therefore depriving the body of much that in the ordinary course would go towards its benefit. In both sexes the undue stimulation leads to a misdirection of physical and nervous energy, and is likely to be associated with, possibly largely responsible for, various conditions due to lack of physical and nervous 'tone'; lack of energy, muddy complexion, indigestion, and constipation, general debility, and so forth. Opinion varies greatly as to the actual harmful results on the body in general and the nervous system in particular, and how far cause and effect inter-react—how far, for example, one may attribute nervous weakness to self-abuse, and self-abuse to nervous weakness. One should, therefore, guard against accepting the extreme and sensational statements of evil results of self-abuse, and see to it that the boys under one's care are not exposed to the terrifying and anxiety-producing effect of such statements. The great appeal should be made on the moral side. The body may or may not suffer, but the mind and character most surely are liable to impairment. Lack of self-reliance, inability to con-

centrate attention upon one matter for any length of time, impoverishment of memory, loss of quick-wittedness are some of the results likely to be associated with impaired nervous energy. Then comes the moral weakness which assuredly follows constant yielding to temptation, and which is the outcome of constant indulgence in sensual thoughts and feelings. It is a misuse of energy—the sex energy—which should be concentrated and conserved, in order that the boy and the girl may grow to their fullest powers of manhood and womanhood, and may then express it in the service of the race. It is here that the great appeal may be made in endeavour to reveal the altruism of self-control as opposed to the selfishness of self-indulgence.

Such an appeal needs constant reinforcement: the child who fails in self-control should not be blamed, but rather encouraged towards fresh effort, and re-encouraged by various devices, after each failure. The relation of self-control to the problems of sex will be dealt with in a later chapter.

It often happens that the lapse into self-abuse is temporary, passing away as the general sensitiveness of puberal change becomes merged into adolescence. It also happens that some pathological condition may be the cause of self-abuse; hence if, in spite of persistent sympathetic effort to influence the child towards self-control, and in spite of effort made by the child to obtain self-control, the habit still persists, medical advice should be sought. Medical treatment is frequently necessary to cope with obstinate cases.

A curious reaction which self-abuse generally brings about is to be found in the stimulation of erotic thoughts: in some cases there is no physical act at all, merely the

mental dissipation of allowing the thoughts to wander aimlessly round sex subjects; the existence of this psychic form of self-abuse should be recognised, for it is just as pernicious in effect as, if not more so than, physical indulgence.

How far it may be necessary and advisable to warn boys and girls against self-abuse is a question which must necessarily be settled for individual cases. Those children who have been wholesomely and adequately instructed in all matters concerning the care of the body, and who have been taught the facts concerning parenthood, and who lead more or less sheltered lives under the constant care of their parents and teachers, will usually be sufficiently fortified against temptation, because the reserve and reticence which should accrue from such training should render them unlikely subjects for objective temptation; or, at any rate, they should need just the incidental word of caution against unnecessary touching of that part of the body. But boys and girls who are destined to greater social exposure, who may be going away from home to boarding-school, or who may be going out into the world to work, stand in need of more definite caution against possible temptation; but in all cases it should be gently, frankly, and briefly given [1]: there is no necessity to dwell upon the matter, but the girl or boy should be given to know that if they are in any need of help, of advice, or sympathy, they may return to the same source for it.

We must, however, realise that whatever it may be necessary to consider in regard to warning and to cure, the great aim is prevention—prevention by careful interest in all that concerns the well-being of the children

[1] See Appendix, p. 260 seq., for suggestions.

under our care, and by wholesome instruction in all matters pertaining and contributing to that well-being.

Before departing from the more purely physical aspect of supervision of child-life, a word may be said in regard to physical exercise. This always has its very great value in the moulding of boy-life, but at the present day runs the risk of being misunderstood in its application to girls. Physical training for girls should be calculated to promote good muscular tone, this in its turn reacting upon the nervous system; it should be calculated to strengthen those muscles which are conspicuously weak in girls, the muscles of the back and of the abdomen [1]; it should train in precision of movement and quick response and alertness; and should be a means of imbuing the movements with graceful and rhythmic control. Boys and girls have absolutely different parts to fulfil in life, a point which should be well in mind when the question of physical training is to be considered, and which leads one to ponder over the advisability of 'mixed hockey,' and to wonder whether the moral advantages derived from such co-practice of athletics may not be outweighed by the physical disadvantage of imposing upon the feminine organism more strain than it should be called upon to bear, and by training the direction of the girl's physiological activities away from those functions which it is her biological responsibility to fulfil.

The abdominal muscles are of very great importance

[1] Cases of spinal curvature are much more common among girls than among boys, the great majority of cases occurring between the ages of ten and fifteen (Saleeby, *Woman and Womanhood*). See also an article on "Spinal Deformity in Schoolgirls," by Dr. Swietochowski, in *School Hygiene*, February 1914, in which this fact is emphasised.

to womanhood. Swimming is one of the best exercises to strengthen these muscles and those of the back. There seems to be a great consensus of opinion that this weakness of back and abdominal musculature which seems so typical of girls is largely due to the cumulative effect of generations of unsuitable clothing, tight and heavy, preventing free development of these muscles, and causing a great strain upon the muscles of the hips. Girls should wear loosely-made garments, with the weight suspended from the shoulders. Very few little girls *ask* to be allowed to wear corsets; it is generally suggested to them that the time has come for them to put away childish things, among them, rational stays and suspenders; and the majority of girls, though they become used to the infliction, and may later in life feel dependent upon the support afforded, find the change, at first, most uncomfortable and restrictive. The 'childish things' should be allowed to remain, and with them a healthy, sensible opinion on the subject of clothing should be allowed to form itself—an opinion which would not allow itself to be overcome by absurd convention nor by the dictates of Fashion's extremists.

CHAPTER V

Supervision—Psychological Aspect

Once the period of puberal change is past, the body settles down into a regular rate of growth and development towards the adult condition. This takes place slowly, though more speedily in girls than in boys, the girl reaching adulthood by the time she is about twenty-three years of age, the boy not till he is about twenty-five. So that the prime problem of youthhood comes to be one of mental nature; concerning the emotional life, the psychic, the moral, and the ideal. During adolescence the social instincts manifest themselves very strongly; the direction of their activity is to be determined. Thoughts of life-work urge themselves forward in the youth of ambitious and independent desire, or are impelled forward by a coming social or domestic necessity. We adults are so prone to forget our own youthhood days, a memory of which would help us so greatly in our attempt to sympathise with the mental condition of those who are young. We are distressed at adolescent conduct; we jeer at the foolishness of youth; we depreciate the value of their imaginings, and their early attempts at self-realisation; we have not the foresightedness to see in the small beginnings the possibility of greatness, and through our lack of sympathetic insight we may often be responsible

for driving the sensitive adolescent back into his shell of reticence, or only to his peers for advice. All this because we forget the days of our youth, or have not the power of looking back to see them in proper perspective value. Who would guide, direct, and influence aright, who would safeguard from possible dangers and aid the youth to steer his course safely through, must understand both the nature and the needs of adolescence.

We have already discussed the mental and physical condition of the period, and trust thereby to have paved the way for suggestions bearing on the care of youth. It is essentially a period during which habits, mental and physical, sown in earlier life may be strengthened and persistently rooted. It is a period during which the physiological habits may be trained and established, a point of particular importance in regard to girl-life. Walter Heape points out the importance of training and directing a girl's physiological habits during adolescence, so that conservation of nutriment (essential to successful motherhood) and development of the maternal organs come as a natural physiological habit. It is greatly important, therefore, that during adolescence no extreme demand should be made upon the girl's physical and mental resources, such as would impoverish her essential womanhood. Mr. Heape is, if one may presume to venture on a comment, somewhat too fearful of the possible results of overwork at school, muscular training, and physical exercise; he seems to neglect to consider in full proportion the natural anabolic tendency of femaleness which enables a woman to accomplish maternity, and which therefore will permit of her doing efficiently other things when maternity is making no demand upon her. The great care should be that

her natural tendency to plus-ness should not be reduced by overwork in any direction to a minus-ness. A woman should be well educated, well trained physically, encouraged to take full opportunity for self-expression, whether it be in the field of labour or in the home, should realise her scope and her possibilities, and know that there is a deep, fundamental biologic difference distinguishing her from man, and that therefore there can be no question of comparison in duties and obligations : there can only be recognition of essential difference in needs, in expression, and in life.

When, in the preceding chapter, the question of physical training for girls was raised, it was largely in pursuance of this thought, that in such bodily exercise there should be no over-direction of the stream of nutriment and of energy away from its biologically destined route. The plan of physical exercise for girls, therefore, should be so formulated, that it may provide, indirectly, the right stimulus towards physiological perfection of function.

Just as the bodily forces may be insensibly directed aright by those who understand the inspiration of their work, so may the psychological problems (which are particularly urgent during adolescence) be aided towards solution in an indirect yet wholly valuable way. In the main, their solution lies in sublimation of sex energy. The great causes for anxiety which distress parents (and parent-substitutes) are generally due to partial or unsuccessful sublimation of this life-force, or, maybe, to its perversion ; greatly might these conditions have been avoided had the adolescent had the benefit of corrective and preventive social and mental nurture, " training them into the perfect exercise and kingly

continence of their bodies and souls. It is a painful, continual, difficult work; to be done by kindness, by watching, by warning, by precept, and by praise—but, above all—by example." [1]

In many girls' schools, particularly in boarding-schools, it becomes the fashion to indulge in highly sentimental friendships. I use the phrase 'becomes the fashion' because I am convinced that when a wave of this sentimentality passes through a school its origin may be traced to one or two girls only—and many who follow do so in imitativeness. Some girls 'gush' over one another, giving presents, flowers; in other cases, a teacher is the object of this display. One must, of course, discriminate wisely between what is a well-founded affection and what is spurious affectation or sentimentality: the former is rarely demonstrative, and is the inspiration, very often, of good conduct. It is possible to prevent very largely a state wrong of affairs overwhelming the school community by certain judicious organisation of school life and school employment: no two girls, for instance, to share the same bedroom or to occupy adjoining cubicles for more than a term; each girl to have a different 'partner for the walk' each day, this to be regulated strictly; it may be the school custom that all duties and pleasures which might be shared by two girls should come under this regulation of sequence of partners. In this and ways similar which will recommend themselves to the Principal and staff of a school, much may be done unobtrusively to prevent the formation of sentimental friendships, while the real, well-founded affection will survive such inhibitory obstacles. This homo-sexual tendency is,

[1] Ruskin, *The Crown of Wild Olive.*

after all, a perversion of the normal sex interest, and is largely to be attributed to the unnatural conditions of segregation of the sexes which obtain in most boarding-schools. If, therefore, provision could be made for boys and girls to meet together in school social functions in a healthy way of companionship, a very efficient aid towards 'good tone' would be obtained.

Boy-and-girl love affairs are a constant source of perplexity and anxiety. This is a matter to be decided on very carefully: no rash judgment or condemnation should be passed. We are facing, now, the development of the normal sex impulse, and we must remember that the racial organs and the racial instinct are of tremendous important effect upon the ego. Sex development is the greatest of all stimuli to bodily and mental development. If, therefore, any inhibition of sex development takes place, mental development will concomitantly be impeded, and suffer.

It is perfectly natural that boys and girls should take an interest in one another, but one must admit that this interest has been, usually, most perniciously fostered and forced into precocity by unwise adults, who so frequently joke about the 'sweethearts' their little daughters have, or tease their young sons about 'being fond of the girls.' The little ones have barely left babyhood, when in some homes they are subjected and exposed to this absurd and harmfully suggestive conversation.

If boys and girls could grow up together, to meet, play, and work in social companionship, exposed to no insidious or blatant suggestion that their acquaintance meant aught unusual, and if, growing up side by side, they are led to self-knowledge, imbued with self-respect

and sex respect, then a healthy companionship will come. It may see the beginnings of adolescent love, but if each is safeguarded by knowledge and respect, and if each is slowly evolving an ideal, as all adolescents should, little, if any, harm is likely to accrue. Here, though, as in all phases we have been considering, conduct may be largely a question of temperament, and that which might severely test one would be of no moment to another. Many girls who have not had the good fortune to have their thoughts and conduct directed aright, and who may have a strongly sexual nature, are inclined to be forward, obtrusive, 'flighty.' There is great need for getting such girls to reconsider their ways; so, too, with the licentiously-bent boy. Each, with that curious psychological precision, almost invariably finds its 'bird of a feather,' and though the first steps of acquaintance may be apparently harmless enough, mere hoydenishness, frivolity, and forwardness, should there be a strong element of sexuality in the temperament, much harm and loose conduct may follow, for which the boy may not be entirely to blame. For girls often are quite unaware that, by apparently harmless ways of conduct, of speech, or of dress, they may do much to make male self-restraint a difficult task, such are the subtleties of emotional reaction. Two strong lines of thought are apparent. The one, that it is greatly important to train girls to combine with a serene and sturdy independence of habit and thought, a discreet and unprovocative demeanour; the other, to so train boys that their sex emotions be habitually under control, immune, and not likely to respond exuberantly to any provocation circumstance may offer. Boys and girls whose conduct is inspired by an

ideal and based upon self-knowledge will be little likely to fall into regrettable conduct, but with the frivolous girl, living more or less for excitement, and with the licentiously-inclined boy, imperilling social conduct, the case is different. Only will an adviser who has been able to gain the respect and confidence of such adolescents be likely to be given a hearing; the 'guide, counsellor, and friend' must be possessed of patience and forbearance, tact in facing disappointment and providing re-encouragement, self-reliance based upon a knowledge of the facts of life, and, above all, a knowledge of the social and home conditions which surround those whom they would help. It is of little avail suggesting to a young couple that they should carry on their sweethearting at home instead of in the streets, when 'home' consists of two rooms to be shared by a family of six! Advice must be tempered by help!

"It would be well," said Edmond Holmes, "if our moralists could realise that the chief causes of weakness in the presence of sensual temptation are, on the one hand, boredom and *ennui*, and, on the other hand, flabbiness and degeneracy of spiritual fibre, and that the remedy for both these defects is to give the young the type of education which will foster rather than hinder growth." [1]

Let us, therefore, consider some aspects of this "type of education." The psychology of adolescence lays bare the material upon which we have to work, the nature of the spirit whose growth must be 'fostered.' Extreme vigour of interests, ready receptivity of ideas, abounding expansiveness of imagination, youthful turbulence of emotion—all these conditions aid towards

[1] *What Is and What Might Be*, Edmond Holmes, p. 282.

the making or the marring of the ego. Temperament is, as McDougall points out, largely a matter of bodily constitution. The great bodily organs exercise upon the mental life a very important influence. Not only does perfect body functioning aid towards mental health by inducing an objective frame of mind, but with a knowledge of the part played by the internal secretions of the glandular organs, we can appreciate more fully the formation of the temperamental product as a complex of factors of bodily origin. Mental and bodily vigour are greatly enhanced by the internal secretionary product of the racial organs. If the force of this stream of energy is not allowed a diffusive outlet in terms of intellectual and physical expression, it tends to find expression through the racial organs themselves, leading to more or less sexuality of feeling. Just as it is possible so to train the physiological habits that the stream of nutriment and of bodily energy naturally finds its right biologic destination, so also is it possible to habituate the psychological activities to certain paths, in short, to beat out psychological tracks along which constant sublimation of energy will take place. Men and women who have led a severely intellectual life since puberty usually effect great sublimation of sex energy; much, however, depends upon temperament: a nature unduly tending towards sex excitement may overcome and discipline the tendency by intellectual exercise, thus finding a wholesome outlet for what might, to the detriment of the individual, be superfluous sex energy.

Sublimation does not involve *waste*, merely change of mode of expression, conservation to the functioning of the individual. Racial energy is too precious a

heritage to be eliminated. But in the interests of the individual, of society and of the race, it is better that its direct expression in sex activity be conserved, and that its superabundance be transmuted, effectively to the improvement of the individual, thus to the benefit of the race.

So it behoves us to consider how the lives of boys and girls may be inspired and directed towards this constant sublimation of sex energy. Sympathy with the psychological condition of adolescence is essential if one's effort is to be of any avail—a sympathy which will understand, yet not pamper, which will guide and encourage, yet not force, and which will provide indirectly for the growth of moral stamina. Training in psychological habit is the great aim. This, the provision of mental hygiene, is infinitely of value.

Regular occupation of the mind, providing outlet for mental activity in the many diverse ways which youthhood demands, is a great prophylactic. When ordinary school employments yield place to leisure hours, these hours should be profitably occupied, monopolised by interests of a play or social nature which may make just as vigorous a demand upon the activities as does ordinary school work. Athletics and other forms of physical exercise and games should occupy no small part of the adolescent's leisure hours, promoting, as they do, bodily and mental tone. The boy or girl who would rather stay indoors, lounging on a sofa reading, or morbidly day-dreaming, is not in a healthy state of body nor of mind, and in absence of any definite condition of physical ill-health, diagnosed, of course, by medical authority, one would be inclined to regard such

a dislike for the ordinary vigorous mode of life which normal adolescence demands and enjoys, as indicative of self-abuse or psychic onanism. It may be well here to point out that it is unwise to allow girls to spend long hours sitting at monotonous work, like knitting or simple needlework, such as makes no demand upon the thinking apparatus and can be performed automatically, for such monotony of occupation is a veritable pitfall to the girl of neurotic tendency, whose thoughts may be inclined towards morbidity or to wander to sex subjects. Lengthy devotion to monotonous employment is natural to and expected of an old lady, but is abnormal to young girls, and should therefore be discouraged.

The normal spirit of healthy adolescence, is a generous one, fully given, fully expressed. Where the sympathies and desires are aroused, interest is spontaneous and exuberant. Witness the wholeheartedness with which the boy throws himself into his football or his collection of butterflies or of birds' eggs. Witness the thoroughness with which the little boy fills his pockets with pebbles, string, an odd engine-wheel, a screw, a bit of candle, an empty matchbox, and all the paraphernalia of a young boy's play that an ordinary-sized pocket will accommodate. Witness the devotion with which the little girl cares for her dolls, with which the older girl follows her fancy work, her tennis, her domestic or feminine interests.

All girls have not the same interests, of course, nor do all boys find pleasure in the same leisure occupations. But whatever be the claim, the child and the adolescent tend to fulfil it generously, wholeheartedly, and concentratedly for the time being. Much of this leisure

occupation tends to be of self-interest, being a mode of unconscious progression towards self-realisation. But social and educational opinion are beginning to realise more and more the possibilities of leisure employment, that although at the time it may have an egoistic centre, it may be turned both directly and indirectly to altruistic destination. The essence of the Boy Scout Movement lies here; the training is a great source of pleasure to the trained; it does not come under their mental appraisement of 'work,' carries with it no infliction of compulsion; yet, based upon a knowledge of the psychology of boyhood and inspired by the thought that "the boy is father to the man," the training in character, discipline, in citizenship, and patriotism that it supplies, all through voluntary adoption (for no boy is compelled to become a Scout, he enters the brigade and leaves it at his own desire), is, indirectly, of altruistic destination, tending to the uplift of society and the improvement of the race.

What the Boy Scout Movement is doing for boyhood (and ultimately for manhood) the Girl Guide Movement, more lately initiated and adapted to the psychology of girl-nature, is doing for girlhood and ultimately for womanhood.

The "Camp Fire Girls" is an organisation in America which is conducted on lines somewhat similar to those of the "Girl Guide" Movement in England, though its work and ceremonies are carried out in a different way. They have a watchword, signs of communication, wear curious dresses and badges strongly suggestive of Red Indian decorations. They have regular meetings, camping out during the summer in the woods and fields.

At the time of writing (December 1914) the membership is 64,000.[1]

A "Camp Fire" or branch may be formed in connection with schools, clubs, and so on, and the work of it is carried on under the "Guardian of the Camp Fire." The would-be member has to undertake to carry out the "Law of the Camp Fire."

THE LAW OF THE CAMP FIRE

Seek beauty. . . .
Give service. . . .
Pursue knowledge. . . .
Be trustworthy. . . .
Hold on to health. . . .
Glorify work. . . .
Be happy. . . .

There are various ranks to which the "Camp Fire Girl" may attain, having to pass certain stages of preparation and certain accomplishments. The whole work of the organisation is based upon the idea that it is a woman's duty to keep the fire burning in the home, and the qualifications which are necessary for the attainment of certain ranks are based mainly upon domestic and housecraft interests.

Much of the work is carried on out of doors and ensures a very healthy life. First-aid, knowledge of handicraft, nature lore, camping, patriotism, health, certain business interests, and certain hobbies which a girl may be desirous of pursuing, or in which she may be accomplished, form the subject of 'honours'

[1] I am indebted to Dr. Luther Gulick, the President of the "Camp Fire Girls," for a full account of the movement.

qualification, and each "Camp Fire Girl" is expected to possess a number of honours.

The "Camp Fire Girls" Movement is not only practical in its aim; it has a very important ethical side to the training. The "Fire Maker's Desire," one item in the catechism, shows this:

"As fuel is brought to the fire
So I purpose to bring
My strength,
My ambition,
My heart's desire,
My joy
And my sorrow
To the fire
Of human kind.
For I will tend
As my fathers have tended
And as my fathers' fathers
Since time began,
The love of man for man,
The love of man for God." [1]

While the foregoing movements have for their object the particular training of character, and have a deep social application, it is possible that other pursuits of girls and boys may be directed along lines of unselfish interest, and may so react upon the character. The social value of organisation, and the educational benefit of co-operation in object, is leading to the formation of girls' clubs and associations through which much 'work

[1] *The Camp Fire Girls* (published by The National Headquarters of the Camp Fire Girls, 461 Fourth Avenue, New York City) gives a very good account of this thoroughly valuable movement.

for others' is done. There is a time in youthhood when 'gathering together' has a great fascination: it is a manifestation of the 'gregarious instinct,' the 'clan spirit,' which is so frequently characteristic of early adolescence. So the formation of clubs and societies, the grouping together of workers with a common aim, besides having a social and a moral value, is beneficial and very acceptable in that it healthily gratifies a natural craving. In girls' schools the older girls may be appointed to 'mother' the little ones; the girls in a well-to-do school may link their interest with those of a poor school, undertaking to aid the poor children by providing clothes (of their own making from new material, or remaking from discarded and mended garments), by correspondence, by small birthday gifts and Christmas parcels, each girl becoming the friend and helper of another less fortunately situated. Again, some girls' schools work in connection with a settlement, sending the fruits of their labours; some schools contribute a regular gift of knitted garments, to the "Deep Sea Fishermen's" Society or other organisations in need of voluntary service.

There are many ways in which the activities of boys and girls, then, may be directed towards social service. Those who have gardens, at home or at school, may find an added pleasure in their gardening when they send their gifts of flowers to an hospital to cheer the patients, or to a poor school shut out, in the depths of a town, from nature's beauties, or when they grow kitchen produce and send it to needy families to whom the small gifts will be a great benefit.

Even in the poorest schools this principle of "do it for someone else" may infuse itself into the work and

play occupations in ways which each teacher may find and apply in his own circumstances and in his own way. "It is my firm conviction that at the present day, three-fourths of the moral evil in the world, or at any-rate in the Western world, are the direct or indirect outcome of egoism." [1]

If the natural altruism of adolescence is supplanted by 'malignant egoism' of adulthood, the blame lies not with the adolescent, but with those elders whose influence might have been more directly stimulative and encouraging to the growth of altruism. It is good for man that he should do something for others out of generosity of spirit. Our boys and girls should therefore be drawn towards the idea of taking up some honorary work, when they are experienced enough to serve. But, side by side with this desire for voluntary service, a broad-minded contemplation of economic problems should be encouraged to grow, so that no voluntary service should be proffered or requested which would lead to the usurpation of paid labour.

Motherhood itself demands great sacrifice—sacrifice of body, of desires, of spirit; it may be that the physiological basis of sacrifice is correlated with the natural disposition of womanhood towards self-giving. Fatherhood makes less biologic demand: hence it may be that the natural disposition of boyhood is less directly of a sacrificial trend, and hence the greater necessity for the cultivation of altruism in boys. Certain it is that thoughtlessness, selfishness, and inconsiderateness in regard to womanhood is very common among men, but this state of affairs may largely be attributed to lack of directive training in self-giving, to lack of knowledge

[1] Chap. vi. p. 278, Edmond Holmes, *What Is and What Might Be.*

concerning all that womanhood and maternity mean, and to a general disposition in home training to place and consider the interests of the boys of the family before those of the girls, a prejudice which is only beginning to be uprooted.

To provide for educative 'play' and other interests of children and of adolescents, will, however, not be sufficient, for, as they grow up and away from school influence, perhaps rebelling against suggested home restriction, the question of legitimate enjoyment and pleasure-seeking must be considered. The mode of enjoyment which is chosen is chiefly a matter of inclination, and what the inclinations may be will largely depend upon the way in which the taste and desires have been moulded during childhood and early adolescence. The safeguarding of youth from social perils is largely a question of their leisure hours. The pleasures of youth form the mainspring of youth's existence, pleasure in work, pleasure in play. Those whose work gives no cause for joy, whose labours are of dead, monotonous routine, will react all the more vigorously in their pleasure-seeking hours. That these may be occupied in wholesome pleasures is a mission for social hygiene to fulfil.

If, reverting to Edmond Holmes' dictum, we are to avoid those factors, "boredom and *ennui*," which are known to be so exceedingly contributory to "weakness in the presence of sensual temptation," it behoves us to form all possible links with broad intellectual and artistic interests. The majority of those people who have little interest in anything except that which immediately concerns themselves, who have no relaxation

away from the things of self, who take no joy, because they are dead to such possibilities, in things of beauty, in the revelations of the mind and soul of genius, are to be pitied, for their youth was denied enlightenment. And when any temptation, any emotional strain or crisis may assail them, they have no escape, no safety-valve, no ideas to distract their attention, and are cast back to find an outlet through their primitive, untransmuted sex emotions. The boredom which Edmond Holmes fears will not be the debilitating lot of those who can find absorbing mental interest in literature, who can revel in the majesty of architectural work or who can absorb its historical interest, who follow the gleam of the artist's lamp, who respond to the musician's note, "claiming each slave of the sound, at a touch," who read "books in the running brook, sermons in stones, and good in everything."

Nor will *ennui* be the portion of those whose thoughts dwell on questions of social reform, who take a living interest in matters political, who are ready to weigh the pros and cons of economic problems, and to view with an abiding concern and a practical outlook the affairs of the community and of the nation.

In the cultivation of broad-minded interests, in the stimulation of an enlightened social consciousness, in the awakening of the young mind to the beauties of art and the triumphs of literature, the school can play a leading part, in these days where so much is done to prepare the teacher for his work, where the specialist is ready to deal with his subject, where the teacher infuses his work with a strong missionary spirit and where, even in those schools which are under municipal or commercial authority, the Principal has great, if not

absolute, freedom in the organisation of school work. Visits to museums, picture galleries, public buildings, school debates and lectures, school journeys, school libraries, camping holidays, social and athletic events are some of the possibilities of scope which spring to mind; and one can foresee great ultimate advantages accruing from the right installation of 'free discipline' and self-government.

We may seem to have departed far from the subject of sex education. Yet this is not so. The greater part of sex education is carried out indirectly by those elders who understand the drift and import of their supervision of child-life. All organic life is ruled by two obligations—by two fundamental instinctive cravings — hunger, the individualistic, and love, the racial. In the ordinary course of development and training the desire for food becomes regulated, and comes under the definite rules of habit and custom. But we do little or nothing voluntarily to subjugate and regulate the racial instinct; this energy, during development, becomes converted into and expressed as various forms of intellectual and emotional force (cultural, social, religious, æsthetic), largely through the agency of culture and education; that is to say, the racial energy is 'sublimated,' transformed, not eliminated. In the course of normal development the advent of puberty tends to intensify the racial energy and to lead to its concentration round the racial organs, and, in the absence of an established psychic sublimatory habit, to dominate and override other tendencies. Extravagant irregulation of racial energy leads to disaster, for the greatest gift brings the greatest responsibility in its train. "Very often a

bad quality is only an energy that has flown in the wrong direction." [1]

It is, therefore, with the aim of establishing an habitual sublimation process that we pursue this policy of supervision and life-direction. "Direct man's passions and energies well and he mounts towards heaven; suppress, pervert, and distort them and he plunges towards hell." [2]

Directed well, man's passions and energies go to the uplift of himself, thence to the service of society till, at the bidding of Love, they may be called to the service of the race.

. . . . . .

With a mind well furnished, a body well employed, the adolescent finds life very full; there is no loophole for boredom and *ennui* supplying a chance of getting into mischief. Let us remember, however, that youthhood is leading to maturity and thoughts of marriage. Let us also remember that many—the majority—boys and girls lead busy lives not unexposed to social risks and to temptation, and that they therefore should be safeguarded by foreknowledge. If we have been successful in leading boys and girls to know of the facts concerning parenthood, and if we have been successful in aiding them to formulate an ideal of conduct involving pre-marital chastity, comparatively little information on the social evil will be necessary to safeguard. But that little should be definite, and given in such a way that it will not warp the delicate sensitive-

[1] *The Conflict between Love and Morality*, by P. M'Carthy More —A. L. Humphreys.

[2] Dr. Constance Long in *Treatment by Hypnotism and Suggestion*, by C. Lloyd Tuckey.

ness of adolescence, nor imperil the ideal we would foster. Both boys and girls, before their emergence from sheltered life, should be told that there are those men and women who through *misfortune*—it may be through lack of guidance and counsel in their youth, it may be through an inherited viciousness of disposition, it may be through some sudden and severe temptation against which they have not been strong enough to stand, it may be through economic pressure due to ill-paid labour—whatever be the cause—through *misfortune* have come to lead ill-regulated lives, and have come to allow their sexual inclinations to dominate instead of to subserve; and that the unfortunate women may tempt boys and men; the unfortunate men may tempt girls and women. Girls should be warned against allowing any approach on the part of a stranger, whether it be man or woman: they should know that they should not under any circumstances, no matter how plausible, accompany an unknown person, even though they may be in clerical garb, in nurse's costume, or nun's habit. They will want to know the inevitable "why?" and should be told that there are those people who, knowing of the weakness which afflicts those unfortunate men devoid of self-control, try to entrap girls to serve the purposes of these men.

Knowledge of the existence of social diseases should be given in the same way, serving to inform, to safeguard, yet not to destroy the ideal. Circumstance will largely lead the counsellor to know when is the right time to tell of these facts—very often a psychological moment will offer. In general, boys need this protective knowledge earlier than girls: it is in the case of the weaker natures often an incentive towards self-

control. No girl, however, should be allowed to reach marriageable age and to mix in the world without knowing of the existence of these diseases, and something of their disastrous effects upon the individual and the race.[1] The object of giving this knowledge should be to strengthen the sense of personal responsibility, responsibility towards others, responsibility towards possible parenthood. It is most important that it be given in a broad-minded way, quite uncalculated to embitter a girl's ideas: both good and evil exist in the world; we are all free to choose. Where women demand a high standard and invincibly adhere to it, that standard will be more nearly reached.

Then as time goes on, Love will enter into the lives of our boys and girls: they will marry and receive the benison of love, little children. But before they enter into marriage there are many things they should know, for there are many things for husband and wife to consider and settle for themselves in order that the greatest happiness of married life may be consummated. Let not, therefore, the care and guidance of youth stop short at adolescence. Let the mother be prepared to help her daughter and the father his son, remembering that if their children have been taught to view the great facts of life in the right way they will be ready to consider all things faithfully unto one another.[2]

[1] See Chapter XI. for fuller treatment of the subject.

[2] *Woman and Marriage*, by Margaret Stephens, published by Fisher Unwin, 3s. 6d., is a simply written volume.

CHAPTER VI

Nature Study in the Service of Sex Instruction

Let us turn our thoughts now to a point to which reference has been made already, and which now requires fuller treatment in order to make clear the full import of the suggestions which already have been made—viz. instruction of children in the facts and truths relating to parenthood. We must inform ourselves of some of the many instances which are at hand of parenthood among the lower creatures and which will serve to make facts clear in the mind of the child—not only facts concerning the transmission of life from one generation to another, but facts which may serve to bring home great truths. The Creator of all living things implanted within those living things a little of His own power: the power of bringing new lives into the world—and though in man that power has reached its highest possibilities of expression, it is a power which he shares in common with all organic life; if, therefore, we can help the young mind to appreciate the universality of the racial powers throughout the kingdom of living things, to realise that each organism is, in a sense, the trustee only, of the spark of life, we shall go far towards inducing a reverent and responsible attitude towards questions of sex and parenthood.

In this chapter, therefore, I hope to show how it may be possible to provide for the answering of children's

questions regarding the origin of life. It is quite possible that in dealing with this aspect, much more detail will be given than is actually needed by any one person attempting to answer these questions, but as it is the object of this work to provide information as far as possible to meet the needs of many people, it is necessary to give more than will be likely to meet the needs of one. No two people are likely to be plied with exactly the same questions from the ever-varying child mind. Then, again, wise instructors will make use of those examples which are close at hand, or by encouraging the children under their care to keep pets, to take an intelligent interest in plants, and so to bring a child's understanding to face the problems that present themselves in a child's mind, will prepare for the day that is likely to come.

It is necessary to begin very early. Perhaps many of us do not realise quite how early these troublesome questions formulate themselves in a child's mind. Dr. Stanley Hall, as a result of one of his inquiries, has shown that the majority of children ask their first questions relating to the origin of life between the ages of $3\frac{1}{2}$ and 8; so simple and so ingenuous are most of these early questions that perhaps we do not realise that they come at a psychological moment, a moment which should not be allowed to pass unnoticed.

"F. $3\frac{1}{2}$. Mamma, where did you get me?
F. 5. Where was I when you were a little girl?
M. 5. Where did baby come from? Did God drop baby down from the sky?
M. 6. Was I a speck of dust? Did it have blood in it?

F. 7. How did God send the baby? Did He send an angel down with it? If you hadn't been at home, would He have taken it back?
M. 7. Where do doctors get babies from?
F. 6. Mamma, where do chickens get their eggs?
F. 7. How did the expressman know where to leave the baby?
M. 7. Where was I before I was born?
M. 7. Where was I when you went to school?
F. 8. How did you know baby was coming and get his clothes ready?" [1]

So often in the past it has been the custom to ignore or evade these early childish inquiries—perhaps through some feeling that the child is too young to know these things: though the child is certainly too young to have all the detail which forms an adult's knowledge, it is not too young to have its curiosity satisfied according to the measure of its capacity for understanding. Or perhaps it may be through some false feeling that these questions are of sexual import, whereas their very ingenuousness and openness is evidence of the fact that the child is approaching this mystery in the same spirit of healthy matter-of-fact curiosity as it approaches the other mysteries against which its inquiring spirit comes in contact.

It is quite possible to answer these early questions in such a way that there is nothing to undo later, to answer them simply and truthfully. A little child's curiosity is generally easily satisfied, and its attention immediately turns to some other matter in hand.

[1] I am indebted to Dr. Stanley Hall for permission to quote from his book, *Aspects of Child Life and Education*, published by Ginn & Co.

Motherhood is the first fact to explain (see Appendix for some suggestions as to how a child's early questions may be met by the mother). Examine a bean-pod in the summer-time and see how the little baby seeds lie encased in soft silky down within the green-walled pod: see the chestnut burr, how within the prickly cup lie the brown-coated seeds,[1] a tough brown coat on the outside to keep them waterproof, and within, the soft brown, downy coat to keep them warm. See how the sycamore takes care of its seeds: curled up within the brown fruit ball, which has been borne down from the tree by a brown wing, lies a tiny green seed kept warm by a blanket of silky hairs around it. The apple pips within the strong core, or the orange pips within the juicy fruit, or the poppy seeds within their strong-walled case, or the large coconut within its horny shell —each and all of these show us how the new young life is encased within the mother's body, all show us how the mother plant makes provision for the safety of its offspring; and when we are showing these things to the children, it is well to dwell upon the æsthetic side and upon the tender side, showing the care that is taken to ensure that the young lives shall be protected. The great fact to be grasped and learned is that living things only come from living things and that a new life begins to grow within the parent. And so it is with animals. Within the body of the mother bird, little seeds or eggs grow. Then, just as the poppy sends her seeds out into the world to grow, and just as the chestnut burr opens to give forth her nuts, so do the

[1] There is no need to split biological hairs in this early work—the differences between 'seed' and 'fruit' may be left to the later work in school.

eggs come from the mother bird's body. And just as the little seeds, kept warm in the earth, fed by the rain, and warmed by the sun, will grow and become, first, little plants and then strong grown-up plants, so will the eggs of the bird, fed by the mother and father bird, cared for, and kept warm in the nest by them both, grow up into little birds, and in time will be big birds.

Some creatures take care of their eggs in a different way from that in which the birds do. They keep them within their bodies for a time, and there, the eggs grow and become little animals before they come out into the world, but very often they are still very helpless and need a lot of mother's care. Guinea-pigs, rats, mice, cats, dogs, sheep in the fields, cows in the byre, the horse in the stable, are all like this.

The great fact of motherhood, by study of these pets of the home, or by the observation of the animals kept on the farm and in the country, may thus establish itself in the child's mind as a universal law [1]; and for the time being all is well. But the time will come when fatherhood must be explained too, and the best way to do this is to have ready an adequate background for reference to be drawn from plant and from animal life, by which facts may be truly and simply dealt with.

The preparation of such a background should be started long before actual reference to the details of human fatherhood may be required. It is most important that in dealing with these great facts we should have nothing to undo, that in the child's mind there should be some conceptions of the ways in which life is transmitted from one generation to another, and

[1] See Appendix for notes on the rearing of animals.

that these conceptions should be TRUTH, albeit truth in a very simple form.

There is another great reason for beginning very early. It will be remembered when we were dealing with the psychological aspect of child development, it was then pointed out how, through some mental 'shock,' a later condition of neurosis (that is, a certain form of mental ill-health) may arise, owing to the way in which ideas or tendencies, which may be in some way of an unpleasing or offensive nature or association, become buried in or 'repressed' into the unconscious. So that if we are to avoid such a contingency as this happening in connection with sex education, it is essential that the knowledge concerning the facts of reproduction should make its way gradually and unobtrusively into the child's mind. There should be a gradual transition in information from that concerning simple types to those more complex; this to be given in terms applicable to all, even applicable to man. If this is accomplished successfully, we shall then have the child's mind in such a position, that it may always appreciate the fact that living things only come from living things, and that also it may feel, when it comes to know the facts of human parenthood, that these are facts which it has known all along, that it has always realised that it takes the effort of two individuals to produce a new life.

Referring back again to the psychological development of the child, it will be remembered that these years of early childhood and the early part of later childhood, are years which are destitute of sex emotion: so far as the sex feelings and impulses are concerned, the child is in a condition of unconsciousness. It is

wise, therefore, that the physical facts of parenthood should be made known during these early non-sensitive years, for then the information is received in a matter-of-fact, unemotional way, and, curiosity being satisfied, the matter is more or less dismissed from the mind, but, by the happy faculty of the then plastic memory, it is stored, to be revived later on.

To leave dealing with these facts of parenthood till the end of childhood or till the early years of adolescence is a mistake, the whole condition then, bodily and mental, being, as has already been explained, one of extreme sensitiveness and instability, and it has been found by those who have talked to children on these matters, that this sensitive period of puberty is a wrong time to introduce the subject. Both girls and boys tend to brood over it, and girls particularly may be frequently depressed and morbid in the face of these new problems. Then, too, it may be pointed out that in the present condition of custom, the majority of children who are not wisely instructed do come to know these facts of life, though usually in a most unwholesome or, at any rate, very undesirable way.

If the child already knows the facts of reproduction, it will be easier for the parent to give the forewarning and advice regarding the approach of puberty, to both girls and boys, than it would be were this previous knowledge not shared between them in a bond of confidence. So that we may take it, there is every argument in favour of beginning instruction very early, and laying down the threads which are later to be gathered together skilfully and woven into a fabric.

Very little children can understand the process of

seed-making if this is explained in simple terms and if suitable flowers are chosen as illustration.

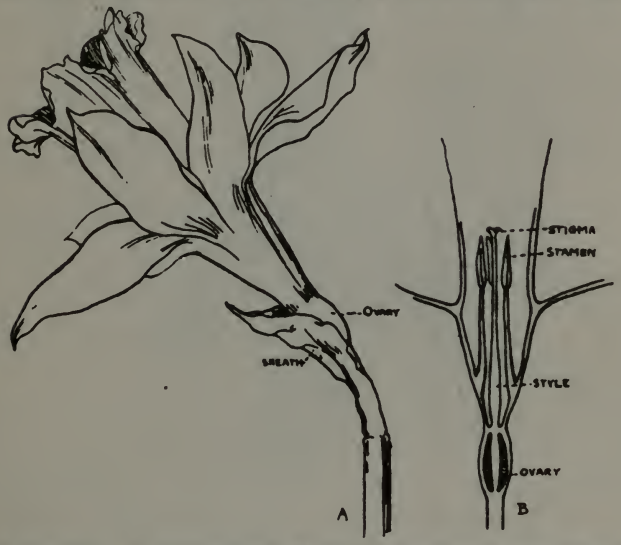
The Tulip is one of the best for little children to study, because its flower-cup is large and the racial organs within the flower-cup are prominent and easy to see. The Poppy also shows the racial organs clearly and well, though, of course, one has to remember the danger here, the poppy being poisonous. The Japanese Anemone, too, is useful in this connection, there being, in this early stage of study, no need to consider the separateness of the carpels in the pistil of this flower; that is a distinction that can be well dealt with in later work, in botany in school. Different varieties of lily (*Lilium auratum* and *Lilium rubrum*) are also excellent, but, of course, too expensive to use in large numbers for class-work, yet the flowers are so large and the parts so well formed and conspicuous that one or two flowers would serve very well for a number of children. Happy is the mother or teacher who may have these growing in her garden ready for study when the time comes; in fact, the wise mother, the foresighted teacher, will see to it that they are planted in time.

The single daffodil with its golden trumpet is another large flower which will serve the purpose.

We would encourage children to study the flowers carefully; to see them in their buds, watch them grow larger, change their colour, spread out their petals; so that perhaps in later life, they may come to realise the preparations that must be made by all creatures for the work of carrying on the species. For the flower does not open, it does not give off its sweet perfume, till the racial organs are ready to perform their functions.

In the centre of the tulip, beneath the golden bell

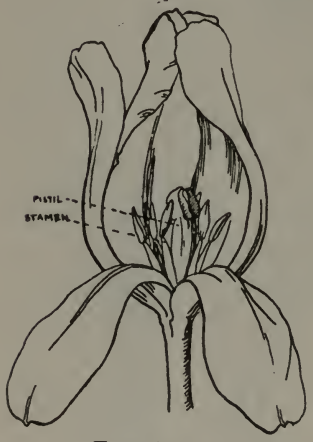
of the daffodil, is a swollen green case, the egg-case or ovary, and in this case lie little eggs, each of which will one day become a seed. But, by itself, it cannot become a seed. Standing round the green seed-box in the tulip, rising up from the yellow trumpet of the daffodil, are six little stalks, each bearing a little box, and when



A, Daffodil. B, Longitudinal section of the flower, showing the racial organs.

these little boxes open, yellow dust comes out of them. We can touch it with our fingers. This yellow dust consists of sperms, and one grain of this dust, that is, one sperm, must join with each little egg in the egg-case, and the two together make a seed. To cut open a beautiful, fresh flower is an unwelcome suggestion to many children, but a withered flower may often be used to show the 'eggs' within the ovary.

This is the process of fertilisation. How, though, does the sperm reach the egg? The sperm is in the sperm-box and the egg is in the egg-box. The flowers, if they cannot drop their own sperms on to the egg-box, have to get someone to help them, and so they



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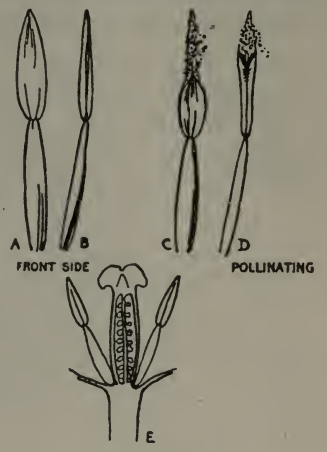


TULIP NO. 2.

A, Front view of stamen. B, Side view. C and D, Showing ripe, anther shedding pollen grains. E, Longitudinal section of stamens and pistil, showing ovules within the ovary.

invite, by their bright colours and their sweet perfume, some of the insects to come and help them; when the insect sees these bright flower-cups wide open and finds them smelling so sweetly, it flies to them, often finding, when it gets there, some wonderful lines to guide it—lines which guide it down into the flower-cup, where it

gets a drink of honey; and as it goes from flower-cup to flower-cup, it carries with it the little sperms that the flowers are needing to join to their eggs. Some flowers do not ask the insects to help them, but they rely upon

Diagram illustrating the Process of Fertilisation in a Flower.

P.G.. Pollen grains being shed. St, Stamen unripe. P.g., Pollen grain on stigma, sending down the pollen-tube (P.T.), by which the contents of the pollen grain are conveyed to the egg-cell in the ovule. S, Stigma. E, Embryo-sac containing egg-cell. O, Ovary. C, Corolla. Ca, Calyx.

the wind, which, blowing gaily, will blow the sperms from one flower to another flower of the same kind. Tulip eggs want tulip sperms, and rose eggs want rose sperms, and each flower requires sperms of its own kind.

Once the eggs have become joined to sperms, the flower no longer needs its bright cup nor its sweet smell, and so the cup withers and the flower devotes its whole energy to the care of its seed-babies, making often a cosy cradle for them and taking care that they shall reach the soil in which they are to grow, safely.

The flowers that have already been mentioned are hermaphrodite, that is to say, two sexes are represented in the one flower, but there are very many types of flowers in which the stamens are in one flower and the pistil in another flower, it may be on the same plant, or it may be on a different plant.

The study of some of these unisexual types will serve as an introduction to the idea of maleness and femaleness. The child has already a conception of what is meant by a family—father, mother, little ones—and as we are talking about seed families, the idea of 'father-plant' and 'mother-plant' should be just in accordance with the child's own conception of family life. It would be well to introduce here the words 'male' and 'female,' if it has not already been done in the earlier study of hermaphrodite flowers. These words are quite simple and short, and, if they have a definite significance to the child, will serve a valuable purpose.

Large unisexual flowers are not, on the whole, common, but we have groups of unisexual flowers which will serve the same purpose. The Red Campion is a single flower, unisexual. The Willow, Hazel, Oak, Dog's Mercury, Hop, have more or less conspicuous groups of unisexual flowers.[1]

Many of these unisexual flowers are pollinated by the

[1] A fuller list of these is given in the Appendix, together with their times of flowering.

wind. A few, *e.g.* Red Campion, Willow, are pollinated by insects.

The Hazel 'lamb's-tails' are very conspicuous in February, hanging on the twigs in long yellow tassels, shaking from them clouds of yellow sperms. The egg-cases are little green buds with a bright red brush, the stigmas, standing out on the top ready to catch the sperms blown by the wind.

The Willow has male flowers on one tree and female flowers on another tree, the male flowers, when they are ready to shed their sperms, being bright golden yellow (children call them 'Golden Pussy Palms') and the pistillate or egg-bearing flowers are silver green ('Silver Pussy Palms'). On a sunny day, early in April or late in March, one can often watch bees flying from one tree to another, sipping honey as they visit each flower, and in their journeys carrying sperms from the male flowers to the female flowers.

These are just some examples of the way in which the processes of fertilisation and of seed-making may be introduced in a simple way to the child's mind, and as one flower after another is studied in the ordinary course of work, the facts will gradually implant themselves by the mere repetition of the story, which repetition is so welcome to the average child's mind. We are all familiar with the stage through which the little ones pass when they love to have stories repeated again and again, insisting upon the tale never deviating, so that we need not fear that, at this stage in mental development, repetition of the story of seed-making will be unduly emphatic, more particularly if we safeguard it by in no way giving undue emphasis to the reproductive processes, for many other phases of plant

life may be wisely and well introduced into this early nature-study work. The study of how plants climb, of the way in which young leaves are protected, of the way in which seeds are dispersed, of the way in which bulbs grow, are just some among the many aspects of plant life which suggest themselves for this early nature-study work.

The study of animal types reveals the evolution of sex. I do not propose to outline an exact scheme of work in this connection, but to give a brief account of some animals which lend themselves very easily and felicitously to our purpose, and to indicate how it may be possible to pass gradually from the study of plants, flowers, and seed-making to the study of animals. A selection of types may be made, all of which may be so dealt with as to form a gradual approach to the mammalian animal and so to Man, for what applies biologically to the mammal applies also to Man.

One would select the types chiefly from those which are in the immediate environment or which may be easily kept in simple aquaria or vivaria; in fact, many of these suitable types can be kept and reared in an aquarium and, being so remote from man, are excellent for providing, in concrete form, analogy which may be utilised for later reference in explanation of human reproduction.

Earthworms, water-snails, land-snails, and slugs are simple hermaphroditic animals, and, being hermaphrodite, are easy to deal with from the point of view of our object in providing a biological approach to sex enlightenment.

When we study earthworms, we observe their general build, their habits, their way of living in the ground,

the way in which they adapt themselves to such a life. We may make simple experiments with them to find out whether they can hear, whether they can smell, which kind of food they like best. We can set up simple wormeries to show the work they do in pulling leaves into the soil, in turning over the soil, in pulverising it and reducing it to a nutritious form for plant food. Out of doors we find earthworm burrows; we see how ingeniously these lowly animals fill the mouths of their burrows with straw, with twigs, with feathers, and with soil. We also see how ingenious they are in selecting the soft, pointed parts of leaves to draw into the ground for their food. All of these are aspects of the structure and habit-life of the earthworm, which are quite easily studied first-hand.

In the reproductive process, the earthworms are hermaphrodite and are cross-fertilised, or, as one might put it in speaking simply to a little child, "It is just the same as you saw in the tulip, only the racial organs are closed up inside the earthworm, for, you see, the earthworm is like a tube, while the flower is like a cup. The eggs and the sperms grow inside the earthworm, and, just as the tulip needed sperms from another tulip to join with its eggs to make them become tulip seeds, so the earthworm needs sperms from another earthworm to join with its eggs. But here is a great difference. The tulip grew fixed in the ground, so had to get the insects to help it, and to bring the sperms from one tulip to another. The earthworm can crawl; it is not fixed in the ground, and so it does not need to be dependent upon anything else to help it; it can do this great work for itself; so one earthworm crawls to another earthworm and gives it the sperms that it needs to

join with its eggs. Then the little eggs are laid in a tiny brown cradle, and the sperms are dropped over them in this cradle; the cradle is closed up, and buried in the ground, and in due time one sperm has joined with each egg, and within two or three weeks, the little egg grows into a tiny earthworm baby and wriggles out of its cradle, beginning to grow, and feed, and wriggle through the soil just as its parents did before it."

The favourite time for egg-laying is during the spring and the summer; particularly in April one can see, on

THE 'RAM'S-HORN' SNAIL (PLANORBIS CORNEUS).

A. Creature emerging partly from its shell—the colour of shell and body is dark brown, nearly black. B, The eggs laid in an oval mass, on water-weed, stones, etc.

examining an earthworm, the enlarged creamy-coloured racial organs shining through the skin a short distance behind the head end and in front of the thickened part of the earthworm, known as the 'saddle.'

Water-snails reproduce in a manner similar to the earthworm, being hermaphrodite and cross-fertilised. One can often see, during the spring and summer, this process of 'giving' taking place if one keeps water-snails in a simple aquarium consisting of a jam jar full of water and some water-weeds growing in it.

The eggs are deposited on the sides of the jar or tank or on the water-weed in clumps, that of the *Planorbis corneus*, the ram's-horn snail, being in oval patches containing from six to twenty transparent, yellowish eggs, each of which is about one-tenth of an inch in diameter. The eggs of the *Limnæa stagnalis* are laid in sausage-shaped clumps, and are clear and transparent, with no yellowish tinge. It is interesting to

THE COMMON WATER-SNAIL (LIMNÆA STAGNALIS).

A, The creature emerging partly from its shell; *f*, 'foot'; *t*, tentacle.
B, The 'spawn' (eggs) of this snail adhering to water-weed.

observe a clump of these water-snail eggs day by day, and see the tiny speck within each gradually developing. Then comes the time when a little touch on the jelly will liberate these young snails. One can watch them so disperse and begin their free lives.

Of the land-snails, the common garden snail (*Helix aspersa*) is very useful, being found on ivy and many plants in the garden during the summer-time,

or during autumn, winter, and early spring one must hunt under stones, in crevices, in the ground, under old flower-pots, and in similar sheltered places for the snails which are in their winter sleep of hibernation. The eggs of the land-snails are laid chiefly during June and July in little clumps of creamish white gelatinous-looking balls (sixty to seventy in a clump of *Helix aspersa*) somewhat resembling sago, and are to be found in the soil. Usually in about fifteen to twenty-one days, though in some cases longer, they hatch as miniature adults, the baby snails being almost colourless, with a thin, transparent shell.

The story of reproduction in the snail is similar to that in the earthworm. The snails are, however, provided with a special organ for giving the sperms to another snail, and one can see the insertion of the tube or duct from one snail into the opening of the other snail, both snails effecting transference of the sperms simultaneously. I have noticed this taking place in the large garden snails kept in a vivarium, in the early spring, just after their emergence from hibernation.

There are many features of interest to study in snails besides the reproductive processes. One may indicate as suitable, the testing of the sensations, as was suggested when dealing with the earthworm; the study of the shell; of the method and rate of movement; and some simple little experiments to estimate the carrying-power of the snail are always of interest. One finds that an ordinary active garden snail can carry on its back six other snails (the sixth one tumbled off).

It is well in this early nature work to draw attention to the common needs of all animal life. We eat food; so do snails, so do worms, birds, frogs—in fact, all animals.

We breathe; so do all animals, though probably not in the same way as we do. A young child, becoming aware of its own heart-beat, as it may sometimes after violent exertion, and inquiring about this, is very likely to ask, "Has pussy a heart?" or "Has the snail a heart?" If this nature work is wisely dealt with so as to bring out the idea of the general principles of function which are common to all animal life, then it will help in considering the question of the reproductive function as being one of the normal functions which are characteristic of all organic life.

Slugs are similar to snails in their method of reproduction, and their eggs, smaller than those of the snail, six to fifteen in a clump, are laid in the soil or under stones and moss, before they go into hibernation; in the case of the Grey Field Slug, during August, September, and October; in some varieties of slugs, *e.g.* the Common Black Slug, hatching occurs after an interval of sixty days or longer, though in the Grey Field Slug hatching may take place within three weeks if the weather is warm. Apparently the eggs may lie dormant over the winter, for I have found them on 31st March. They hatched on 6th April. The eggs of the yellow slug are small, yellowish, semi-opaque balls about one-eighth of an inch in diameter. The young of the Common Black Slug bury themselves in the ground for four or five days after hatching, and then emerge nearly double their original size.

Spiders are interesting animals to study. Particularly during late September and October, the common Cross Spider (*Epeira diademata*) is to be found in gardens and on the hedges weaving its web and waiting in the centre thereof for the unwary fly, or perhaps hiding under the leaves near by, ready to dart out on the first vibration of the web caused by the fly alighting thereon.

One may watch the way in which this web is built; one can study the habits of this interesting little creature; the way in which its body is constructed, how the head and chest are joined into one, and the large abdomen is attached to the chest by a tiny 'waist'; the four pairs of jointed legs attached to the chest are seen to have each their own duties; apparently the hind legs are little used in walking, but when the creature is suspending itself on its silk or is constructing its web, it guides the silk by its hind legs, and when it is running up its silk, it collects it as it goes, by its front legs. The action of the jaws may be watched, the covering of the body observed. Then, too, it is interesting to find out what power of hearing the spiders may have; whether they are sensitive to smell; whether they can appreciate the difference between light and darkness. It is possible to devise and carry out simple experiments by which one can show, in various ways, whether the spider is capable of responding to stimulus. During October, hunting under leaves on the ground or in sheltered spots, one is often able to find the males of *Epeira diadematа*. The female, recognised by the large, heavy abdomen, weaves the web; the male weaves but little, if at all. The male is much smaller than the female; in proportion, the abdomen is narrow and reduced in size; each feeler has a 'knob' at the end (really an organ for transmitting the sperms to the female), and so it is easy to distinguish males and females. Life in spiderdom seems fraught with much trouble and anxiety, at any rate for the small male. Frequently the males 'display' before the female, performing curious antics, balancing on their legs in a curious fashion, contorting themselves, and generally manifesting an active expression of racial energy which

is frequently designated 'the courtship dance.' The female makes a selection, but even then, all may not be destined to go smoothly, for her ferocious temperament often leads her to attack and kill her would-be mate.

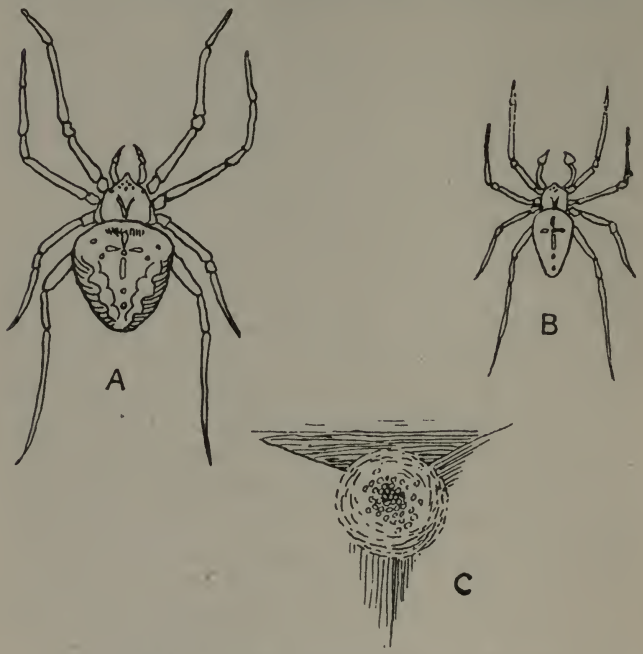
Some stages in the life-history can be obtained quite easily if a male and female are put together in a large glass-covered box,[1] and, within a few days, it will usually be found that the eggs have been laid by the female and deposited in a silken cocoon fastened up in a corner or under a ledge in the box. So does the mother spider care for her young. This silken cocoon, yellowish in colour, may contain as many as two hundred eggs of a pale orange-yellow colour. One has to wait patiently for the hatching of these, for the eggs of *Epeira diadematа* usually remain dormant over the winter, hatching the following spring. Eggs laid on 25th October hatched the following May. One day it was seen that numbers of tiny spiders were wriggling out of the cocoon in the box, leaving their empty white egg-shells behind them. For some days they remained congregated around the cocoon, and then gradually, producing silken threads, they dispersed from the cocoon and spread themselves out in the box.

The skin of the young spider is unelastic, hence it is necessary to moult its skin, developing a new body cover, thus making accommodation for increased body growth. Its first meal is usually its first moulted skin; after that it is wise to put the box open, out of doors in the sunlight, when the young spiders will be dispersed, being borne away on their silken threads by the wind.

Soon after the eggs are laid, perhaps a day or two days after, the female dies; the male sometimes lives longer.

[1] See Appendix.

The House Spiders and the Water Spiders are also very interesting in their habits and life-history.



THE COMMON GARDEN SPIDER (EPEIRA DIADEMATA).

A, Female. B, Male. These spiders vary very much in size when they are mature. The female may be ⅔ inch long in the body and the male ⅜ inch long in the body. The varieties differ in colour, being various shades of brown and reddish-fawn, with lighter marking. C, Cocoon of pale yellow silk, containing a clump of pale orange-coloured eggs. This cocoon is often found fixed up in sheltered corners.

Their breeding season falls during the summer months.[1]

[1] See Appendix.

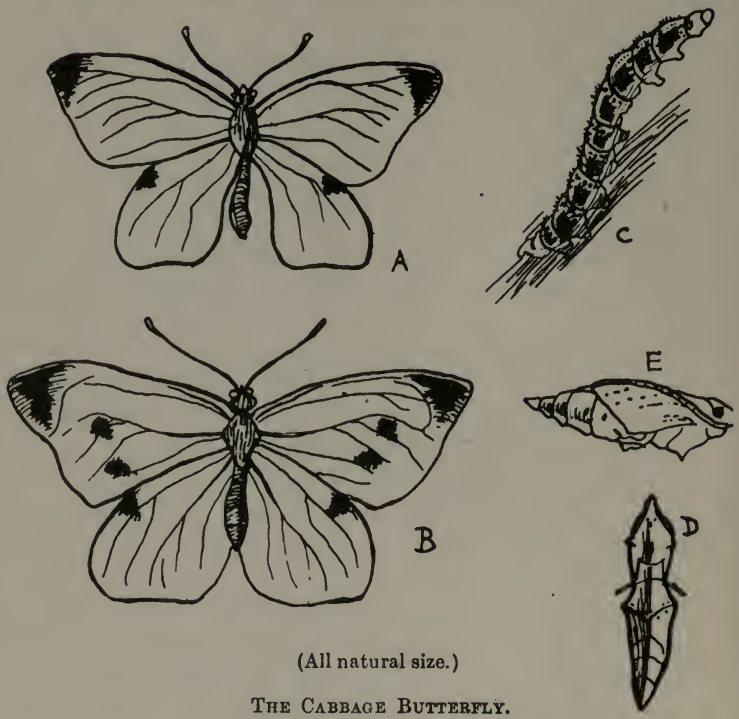
The life-history of the house-fly or the blow-fly, the earwig, the cockroach may easily be observed.[1] Though from some points of view these insects may not be considered attractive, nevertheless they are of extreme interest, and, in point of view of an object in providing a biologic approach, may be the only ones easily obtainable, or may be the ones, because they are so common, on which a child's curiosity may fix itself.

The Cabbage Butterfly is usually quite easy to procure and to rear. The eggs are laid in little clumps on the under surface of cabbage leaves, and hatch, producing very tiny caterpillars. These feed voraciously, moulting periodically. Their cast skins are often found on the cabbage leaves. These caterpillars, too, may be found on nasturtiums. They live for several weeks, feeding, growing, moulting, feeding again, and so on; during their caterpillar life moulting, perhaps, five times.

Before moulting, the caterpillar usually retires to rather a sheltered part of the leaf, or if being kept in a vivarium[2] it fixes itself on the side or preferably the top of the box, resting for a period of about twenty to thirty hours before the actual moult takes place. When it is fully grown, and preparing for its fifth moult, it fixes itself by means of a silken cord on to some foundation, if out of doors, in some sheltered spot, perhaps under the corner of the railings, in a crevice of a stone wall. Then it draws itself up, becomes shorter and thicker, somewhat paler in colour, casts its skin, exudes a gummy material from the surface of the body, which gradually hardens into an angular case, one end of which is segmented in a way similar to the caterpillar's body segmentation, the other end having

[1] See Appendix. [2] See Appendix.

marks and folds somewhat resembling the outline of wings. In this condition it is known as a 'pupa' or



(All natural size.)

THE CABBAGE BUTTERFLY.

A, Male. B, Female. C, Caterpillar on leaf. D, Pupa showing mode of attachment by silken cord. E, Pupa (side view).

'chrysalis.' It is interesting to observe that the colouration of the pupa tends, in some measure, to resemble the colouration of the foundation upon which it is fixed. These caterpillars and those of the lesser cabbage butterfly may be reared in glass-topped boxes lined

with different colours; for example, one lined with red, one with brown, one with green, and so on; and as they go into pupation, one obtains decided differences in the colour of the chrysalis, each set tending towards the shade of the box lining. This is one way in which the caterpillar meets the struggle for existence.

The cabbage butterfly passes through two generations in a year. The caterpillars which go into pupation at the end of July (they usually pupate on the cabbages then) hatch at the end of a fortnight or three weeks, if the weather be ordinarily warm, as mature butterflies, the female being marked with three black dots and black patches over the corners of its cream-coloured wings, the male being much less conspicuous in his marking, and slightly less in size.

One may see during the summer days the male busily chasing the female, and perhaps alighting on her in the process of fertilisation. Then the fertilised eggs are deposited on the under side of the cabbage leaves, and in due time hatch, another brood of caterpillars being produced. These go into pupation about September or early October, finding their way to a sheltered spot, and remain in this state till the following spring, when they hatch.

The Currant Moth lends itself easily to this observational work, so also do silkworms.[1] Many other insects are interesting to study: Stick Insects are particularly simple to rear; the eggs may be bought and kept till they hatch,[2] the young creatures fed and reared till the eggs are obtained, the life-cycle so complete.

In the garden one may watch the Ladybirds, those dainty members of the beetle family. Perhaps they may be seen in pairs on the leaves, where the creamy-white eggs are laid, and hatch in ten to fifteen days, produc-

[1] See Appendix. [2] See Appendix.

ing little smoky-black larvæ, which are known to the gardener as 'niggers.' These in time pupate on the under side of a leaf, fixing themselves by the tail: in about two weeks' time they emerge as adult ladybirds.

The Skipjack beetles, narrow, light-brown-backed beetles, are often to be seen during the summer months in pairs on the leaves of the turnip, cabbage, and, in fact, nearly all plants in the garden; the eggs are laid in the soil, and hatch into those curious larvæ known as 'wire-worms,' which live in the soil and feed, much to the gardener's annoyance, on the roots of plants. Mustard and flax are said, however, to be exempt from their attentions.[1]

We may now pass to the vertebrate animals. Children are very fond of keeping goldfish. These, though certainly very interesting from the point of view of studying the fish as an animal, are not particularly valuable as providing much illustration in our pursuit of the biological approach, for they are difficult to rear in an ordinary small aquarium, and it is somewhat difficult to identify male and female. The female is of stouter build than the male, and the male shows a depression near the anal fin, that is, the last single fin on the under side of the body, just beside the opening of the digestive tract.

However, the story of the way in which the goldfishes reproduce may be told. The male chases the female of his choice, and together they wander among the water-weed; she lays her eggs on the water-weed, and the male swims over them, depositing 'milt,' *i.e.* the spermatic fluid; the eggs are thus fertilised, and hatch in three to six days as tiny fish.

Sticklebacks are very common pets of the aquarium;

[1] Theobald.

they are easily obtained from ponds and lakes, and also from streams. They are small, graceful fish, with three spines along the back just behind the head. These spines can be seen moving up and down while the fish is swimming, but while it is poised in the water they are not so easy to make out, being bent backwards flat against the back. As the breeding season approaches—in March or April—the male becomes excited, changes colour, the throat and breast becoming a brilliant red. (The female does not show these changes of colour.) He becomes very active, swimming up and down in front of the female, coaxing her towards a spot where he intends to set up their home. He binds together water-weed in a quiet, sheltered spot, weaving it into a delicate nest, and when this work, which occupies two or three days, is done, he coaxes and pushes the female into this abode. There she lays the eggs, then he passes in and ejects milt over them. They are fertilised, and the female leaves them, the duty of caring for the eggs during their period of development devolving upon the male. He keeps in front of one opening of the nest, and by waving his fin and tail energetically, causes a current of water to flow into and through the nest, and in this way the eggs are supplied with oxygen, which they need for aeration. The young appear after about two weeks. The male still looks after them for a while, but when they are strong enough to leave the nest, he flicks the nest with his tail, breaks it up, and the little ones are launched out into the world to look after themselves.

Sticklebacks, because they are so energetic, so interesting in their habits, and so easily tamed, are, to children, very interesting little fishes to keep in an aquarium, while to adults, the features of their life-history,

their habit of nest-building, have a special illumination because of the clear evidence they give of the value of psychical fatherhood, even among such lowly animals as these.[1]

Minnows, too, are nice aquarium pets, but they have not the interesting habits which are so delightful in the stickleback. One can almost, perhaps half whimsically, perceive a contrast in their build and associate it with the contrast in disposition—the minnow's rounded head outline, unaccentuated mouth, being in accordance with its placid way of life; while the little, energetic, responsive stickleback shows definite angularity and forceful outline of head, mouth, and fin, and its whole body seems suggestive of activity. The home of the minnow is in the pond or stream, and when the breeding season approaches (*i.e.* in May) they make their way to a sheltered part in the depths of the water; there the female selects a suitable place and lays her eggs in a little groove, the male swimming over them and fertilising them with the sperms he ejects over them.

The story of the salmon is familiar to most of us. The tremendous impulse which drives these and all creatures to fulfil their obligation to carry on the species, to perpetuate the race, is spoken of as 'the racial impulse,' or 'racial instinct.' Its manifestation we can appreciate in the coaxing ways of the male stickleback, in the brilliance of colouration (which may be regarded as an expression of the vigorous productivity of the organism at the time when it is in condition of reproductive activity) which makes itself shown at this period; and in the salmon this racial impulse drives the two sexes, when mature, many hundreds of miles from the sea, up

[1] See Appendix.

rivers till, in their journey, they find a quiet shallow where this important work may be safely carried on. So imperative, so forceful, is this racial instinct in the salmon that, male and female, together they go hundreds of miles, never stopping for rest nor for food; no obstacle can hold them back. They leap up falls with determined repetition, till they succeed. Then the female, making a groove in the quiet, sandy bottom of the stream, deposits some eggs in it, and then over them swims the male, depositing sperms. Again the female deposits eggs, the male then fertilising them, and so on till all the eggs have been discharged from the ovaries in the female's body; which may take two weeks to be achieved, for a salmon of an average size may lay as many as six thousand eggs. This takes place in winter-time.

When the salmon have finished this work of producing eggs and milt, they are very different fish from what they were in their riotous journey up the river: they are enfeebled, exhausted, weak, and often drift helplessly, tail foremost, down the river, few of the old ones reaching the sea alive, so great is the sacrificial toll imposed by the race—a law of sacrifice—demanding little or much, sometimes all—which the lower animals follow blindly, instinctively, unknowingly; but which Man on his higher plane of evolution, with his knowledge, his reasoning, his wider sphere of life-relationships and obligations, his power of choice, may accept and fulfil, may evade, or may be forced by circumstance to forego. The altruism of human maternity is the highest expression of this universal law.

Of course, very few of the six thousand eggs ever grow into a full-sized salmon; many are lost, numbers of them are eaten by other fish, for many fish like dainties for

their food. But those which do survive hatch in about four months' time, and when about a year old leave the breeding-place in the stream, and, as little fishes about 1½ inches long, they begin their journey down the river to the sea. Here they live, apparently feeding voraciously, growing strong and large until the time comes when they, as their parents did before them, feel this tremendous, driving impulse, the racial instinct, which obliges them to do as their parents did, and take the long river journey.

The salmon lays many thousands of eggs, the stickleback but few—twelve to twenty. The salmon, however, exercises practically no care over the eggs, while the stickleback looks after its young till they are safely hatched. So that we realise in the case of the salmon, were only few eggs laid, the species would probably soon die out, because of the many risks attendant on development, but in the stickleback, where a certain amount of parental care is taken, the safety of the species is assured, so there is not the racial need for so many eggs being produced. This is a biologic code—the greater the number of offspring, the less the parental care, or *vice versâ*, the less the number of offspring, the greater the parental care. One sees it exemplified among the most lowly organised members of the kingdom of living things. Even in the plant world its workings may be traced. The poppy flower ripens into a fruit, shaking in the wind, indiscriminately flinging away its thousand small seeds to be, by chance, buried in the ground and nurtured. The coconut flower, to take an extreme contrast, forms a fruit containing one seed, fully and lavishly equipped with nutriment (the white 'flesh' and 'milk') upon which the embryo may feed, well-encased in a woody

wall, this enwrapped in a fibrous, boat-shaped, waterproof, buoyant covering, the whole ensuring a safe journey to a new growing-ground by water transit. And as we climb the scale of life, we are constantly brought to realise the general fact that the number of offspring and parental care of them are in inverse ratio.

We see this exemplified in the frogs, the toads, and the newts, the next family of vertebrates which are easy to study, and which represent one degree higher in the scale of life. All of these amphibious creatures pass the winter in a condition of hibernation, burying themselves in the mud at the bottom of a pond or under turf or stones. Frogs will hibernate in this way, somewhat gregariously; seven or eight of them are sometimes to be found in one group in the mud.

When the opportunity of getting their normal food ceases, that is, at the end of the summer when the insects are few, these creatures retire to the bottom of the pond, and there, in the mud, they spend the whole winter in a condition of lowered vitality and of dormancy, which is not sleep and not death. In the spring, towards the end of February, they come out from the mud, and come up to the surface of the pond, the males croaking lustily, particularly in the evenings. This croak is the courtship song of the male. He is considerably smaller than the female in size, has curious little pads on his hands, and his forearm is thickened.

During mating, the male is on the back of the female, and as the eggs pass from the ovaries within her body, the sperm from his body passes over them, and they are fertilised.

Here, again, we have an example of fertilisation taking place outside the body, but it must take place immedi-

ately the eggs are extruded, hence the reason for the smallness of the male in proportion to the female, enabling him to perform this act successfully.

One frog may produce one thousand eggs. When they are first extruded from the body, they are quite small black globes, each surrounded with a transparent jelly, but after they have been in the water for a time, this jelly begins to swell, separating the eggs from one another, yet securing them in one light, buoyant mass. Parental care in the frogs goes no further than this, after the eggs are deposited near the water-weed. But the physiological care that is shown is evident, when one realises just how valuable is the black colour of the egg, and the surrounding globe of jelly.

In March, when these eggs are laid (usually the second week), the weather is cold, and the rays of the sun are not very powerful ; the jelly, clear and buoyant, supports the eggs on the surface of the water, where they may obtain the maximum effect of the sun's rays, and each globe of jelly being transparent, acts somewhat as a lens, focussing the sun's rays on the little black egg within. The very blackness is also an aid, for black is a colour which absorbs heat, so we see how the small amount of heat available at the time of the year is concentrated on the eggs, so that they may be kept warm and development may take place. Nor is this the only advantage in the jelly. Its slipperiness renders the frog-spawn difficult to catch, and the enterprising duck or swan, who would have a meal of frogs' eggs, finds it a meal difficult to secure.

The life-history of the frog may well be studied, beginning with the frog-spawn. Eggs which have clear, transparent jelly are healthy, and likely to develop

well, but often we may find frog-spawn in which the jelly has gone milky-looking. These eggs will not develop.[1]

About ten days after the spawn is laid, a little black tadpole wriggles its way out of the jelly. During these ten days the egg has changed from the round, black fertilised egg to an oval creature which, gradually developing a head end, and becoming comma-shaped, begins to wriggle and make its way out of the jelly, finding its way to the weed. It now enters upon a fish-like existence, which lasts about three months. On the water-weed it remains, attached by a sucker. From the sides of its body, just behind the head, three tiny branched filaments appear. These are the external breathing organs or gills. Soon, within a few days, these disappear and are replaced by internal gills.

The tadpole lives on vegetarian diet till it is about two months old, then it begins to have carnivorous inclinations. When it is about two months old, the hind legs begin to show, and later the fore-legs, and it comes up to the surface of the water very frequently, to breathe. About this time it ceases to feed, but we notice that its tail is gradually shrinking; it is being utilised through the blood stream, as a means of food, and gradually dwindles in size till we have our little tadpole converted into a miniature frog, and entering upon its adult life.

The life-history of the toad is very similar. The eggs, however, are not laid in masses, but in ropes and festoons across the water-weed. In the newts, we have some signs of parental care, and fewer eggs laid, for as each egg is laid the female newt places it carefully under a leaf, folds the leaf around it, and in

[1] See Appendix for rearing of frogs.

this way the early stages of development are protected. Both newts and toads go through the tadpole stage of development, the newt tadpole keeping its external gills throughout its tadpole life; they are finally absorbed and disappear towards or during the winter months.

In the breeding season, the male newt develops a frill along his back, otherwise the males can be distinguished from the females by the more conspicuous colouration of the abdomen, the spots and blotches of orange and brown being larger and more elaborate in the male than in the female.

Sometimes, when one is wandering over dry moorland or dry, rocky places, one may find lizards. The grey Viviparous Lizard is easy to keep and rear in a simple vivarium [1]: the sexes are somewhat difficult to identify. The blue markings down the side of the male are, however, more conspicuous than in the female. Most lizards lay eggs, but the Viviparous Lizard retains the fertilised eggs within the body until they have reached a certain stage in development, and when the young are born they resemble miniature adults. They are born usually in July, and as many as eight may be born at once; small creatures about an inch long, very like their parents; they feed on green flies and other small insects.

We may now pass on to the birds. These are particularly interesting, because they show us such refined evidence of parental care: the construction of the nest, the incubation of the eggs, the feeding and training of the young, are all of intense interest.

Birds lay much fewer eggs than do either the fish or the frog, most of them laying not more than five or six at

[1] *Pets and How to Keep Them*, by F. Finn, published by Hutchinson & Co., is a very useful book.

a time, while some of them lay fewer than that. Consequently we find that, in order that the success of the race may be ensured, the birds exercise instinctively great parental care. When the breeding season is approaching, both in their ways and in their appearance the birds make the fact known, for the racial instinct is very strong, very imperative, and very expressive in this family. The sweet song in spring-time, the extreme activity, the graceful, active movements, particularly of the male birds, the brilliance of plumage, at this time, are all indications that they are ready to perform the work of reproduction.

When the racial organs are mature, that is, at the beginning of the breeding season, the physiological condition of the body is naturally rich, and this surplusage of nutritive and energetic condition shows itself in various manifestations which we are wont to recognise in the courtship season of the birds.

The plumage, which may have been comparatively dull, becomes bright and conspicuous, particularly in the males : adornments develop, the song gains in strength, variability, and harmony. The peacock, with his hundred eyes in his gorgeous tail, and the plain peahen, are familiar to us all. The female sparrow is dull and dingy compared with her black-throated mate. Children like to say, " The gentleman sparrow wears a brown coat, a grey waistcoat, and a black tie, while the lady sparrow is in dingy grey and brown." The male blackbird is distinguishable by his black plumage and orange beak, while his mate, similar in shape though somewhat more slender and less robust, is dark brown in plumage, not even rejoicing in an orange beak. The handsome male bullfinch, with his bright pink breast, grey back, white

stripes in his black wings, far overshadows in his beauty his more quietly-garbed mate, whose breast is a soft greyish pink only; and so on, pretty well, throughout bird life. It is interesting to note, however, that in the birds of prey the female carries off the palm for size and vigour.

In some birds, it is more difficult to distinguish the sexes by their appearance, particularly in those which sing sweetly. The male and female Robin are very much alike, so also the male and female Thrush. The Chaffinch, Starling, Yellow Hammer, Swallow, all, however, follow the general rule, and we are all familiar with the common domestic fowl as an example of sex differentiation.

Among birds the courtship life is very elaborate. Many of them show quaint ways of wooing, and frequently the males are distinctly combative. We are told the story of the Penguin's quaint courtship, how the male bird carries stones in his beak and deposits them at the feet of the one he would woo, making a little heap of them in front of her. Should she approve, she allows him to go on building his heap of stones, but should she not be inclined to accept his attentions, she turns away, indifferent, and leaves him to build another heap of stones for another bride-to-be.

One could dwell long upon the fascinating subject of bird life, but it is much more fascinating to watch and observe the ways of our feathered friends than to read of them.

Children should be encouraged to feed the birds, and in this way to attract them near enough for them to have a chance of watching them and studying them.[1]

Courtship time ended, the work of nest-building begins. This is frequently shared by male and female,

[1] See Appendix, 'Feeding of Birds.'

although very often the male does the greater part of the work. The Chaffinch builds its nest of moss, lichen, dried grass, lined with down, feathers, and hair, in a bush; the Sparrow makes a most untidy nest in a hole or crevice under the eaves of a house or barn. The Blackbird weaves twigs, roots, and dried grasses, planting them in a hedge, or on the branches of a fir tree, though occasionally making a mistake and constructing the nest in the ground, and when this happens the eggs usually do not develop.

A Thrush's nest very much resembles that of the Blackbird, but is lined with mud. That fascinating little friend of man, the Robin, has a great predilection for articles of domestic association; we may find his nest in an old shoe, an old kettle, a rusty pan, in the corner of a barn, on a shelf, and not infrequently he invades our house and makes his home there.

"A Street Troubadour" (in *Lives of the Hunted*, by Ernest Thompson Seton) is a charming little story of sparrow life, and one to which children listen with charmed intentness and ready sympathy. Some little girls at school once decided "to do an experiment." It was spring-time. In a corner of a dingle they put out open boxes of wool and fluff: they tied, loosely, wools of different shades (mostly brown, grey, black, and yellow) to the railings and to the bush twigs. To their great delight these wools disappeared as the days went on. They played at being 'Mr. Kearton,' and stealthily watched the birds come and help themselves to the treasure-trove of wool. But the yellow wool was always left!

Birds usually show great discrimination and sometimes great daring in their choice of building places, securing their nest from observation, either by success-

fully hiding it from view, or in some cases by choosing a site which is likely to be very safe from invasion, and when they choose a site like this, they usually build but little. Nowhere is this seen to better advantage than among the gulls. The Kittiwakes choose a narrow ledge high up the rock-side, and there, in a colony, make a rough nest of seaweed; the Herring Gull and the Great Black-backed Gull have the same gregarious habit and a similar taste in nest-building. Some species of gulls migrate more or less inland for breeding; they sometimes resort to a patch of marshy ground (Great Black-backed Gull). The eggs of gulls which choose a high narrow ridge of rock for nesting-site are peculiarly adapted for safety in such a precarious position: they are very much pointed at one end, broad at the other, so that, if pushed, they do not roll off the ledge, but simply wheel round on their narrow end into safety. The Ringed Plover and the Common Tern choose a little hollow on a pebbly or sandy shore, and there lay their eggs, which, however, are safeguarded by being speckled and in general appearance closely resembling the pebbles around them.

When the nest is ready, and the eggs within the ovary of the female are ready also to be fertilised,[1] sperms are ejaculated from the opening in the male's body [2] into the opening of the female's body, and each egg is fertilised by a sperm which finds its way up the duct to meet the egg. After fertilisation has occurred, the egg passes down the duct, on its way is encased in shell,

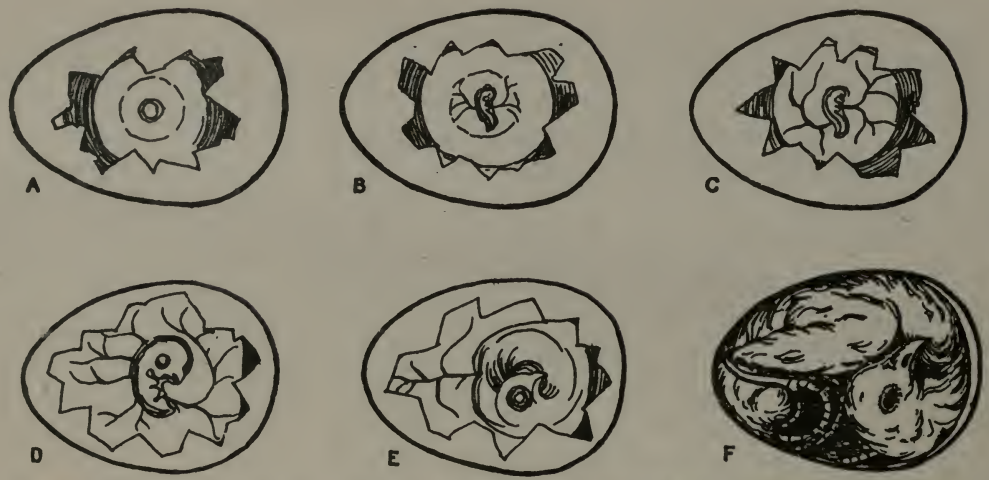
[1] In most birds there is only one ovary, the left; the one on the right side dwindles away early in life.

[2] The ducks, geese, and Ratitæ (ostriches, emus, kiwis) possess a special organ for transference of spermatic fluid.

and then is deposited in the nest. Within each egg is a little ' germ disc ' which is the living part of the egg. It will grow and become a chick. Surrounding this germ disc, the chick-to-be has a food-supply, the yolk, and round that again, more food—the ' white ' of the egg. At one end is a little air space, so that the growing chick can have the air it needs, and the yolk is wonderfully balanced on twisted cords so that, as the mother turns the egg over daily, to prevent the embryo from sticking to the shell, the germ disc always comes up to the upper side of the egg, that is, it remains close to the mother's body, and is so kept warm.

Many days have to pass before the germ disc becomes a fully developed chick (in the case of the domestic fowl, about twenty-one days, the pigeon, fourteen days), and it can only develop if it is kept warm and is fed and supplied with air. We have seen where the food and the air are in the egg, and the warmth is supplied by the mother, and sometimes the father bird, sitting in the nest over the eggs, fluffing out their wings over them and so keeping them at an even temperature.[1]

[1] The study of eggs during incubation is very instructive. Twenty to thirty eggs may be placed in the incubator, and one broken open and examined each day. On the second day the rudimentary backbone may be seen clearly, and on the third day the heart may be seen pulsating. But I doubt whether such study, valuable as it may be from the scientific point of view, is altogether advisable for young children and early adolescents. The breaking open of the egg leads, within a short time, to the death of the embryo, and while an immediate examination of the embryo impresses the fact that the creature is a *living creature* even at this early stage, the ultimate result of such examination is to kill. And herein lies the danger that the sensitiveness in regard to all living creatures may be warped. The fact that one wishes to impress, is that from the moment of conception the creature is *alive*, and for that reason it seems that one should forego



A Series of Diagrams showing the Chick developing from the Egg—the Shell is broken away to show the various Stages.

A, 1st day—showing germ disc on the top of the yolk. B, 3rd day. C, 5th day. The embryo is enclosed in membranes, and is supplied with nourishment from the yolk. D, 8th day. E, 12th day. F, 19th day. The chick is almost ready to leave the egg-shell.

This period, known as the 'incubation' period, is a tiring one for the mother bird, exhausted as she already is with the physiological effort of producing the eggs, but the father bird is very good to her, keeping her supplied with food, sitting near the nest singing to her, and sometimes relieving her while she goes and seeks some food for herself. Then the day comes when the chicks are fully formed and ready to come out from their shells. By this time they have a strong beak, and from the beak projects a sharp point, the egg-tooth. With this, they poke their way through the skin of the egg, fill their lungs with air from the air-chamber, and so take

NEWLY-FLEDGED CHICK—21ST DAY.

detailed observation of embryological development so far as the education of the young is concerned.

The development of the water-snail may be watched through a hand lens—or better, through the microscope: so may the development of the land-snail and the slug. These each show the embryo moving and pulsating within the egg, and it may be observed until emergence from the egg takes place. A study of models showing the developmental stages may be helpful. Probably it will be necessary to explain that these models have been prepared by scientists who have been able to find out all about the growth of these creatures. In many museums such models are to be found. The Natural History Museum, South Kensington, has models of the developing egg of the fowl, a series of embryos and young of various fishes, amphibians, and some others (Bay VI., Central Hall), development of a mollusc (*Crepidula*) (at present in the North Hall) and of a star-fish in the 'Echinoderm' Gallery.

their first good breath, break open the shell with their sharp egg-tooth, and so make their way out—little, damp, bedraggled creatures.

The chick of the domestic fowl has soft down on it by the time it is hatched. This soon, in a few minutes sometimes, gets dry and the chick starts on its way in the world, a very independent youngster. But the majority of song-birds are hatched without any feathers; they are very helpless and need considerable parental solicitation for some days, perhaps a fortnight, after they are hatched. Their parents feed them; these baby birds are wonderfully hungry little creatures, keeping their parents busy all day, but, bit by bit, they grow larger and stronger, their beaks look less abnormally large, they begin to develop feathers, and soon grow too big for the nest; and then they are turned or carried out of the nest and taught to fly, and to fend for themselves. Some birds extend their parental care even after the nestlings have left the home of their babyhood. I remember watching a row of young swallows sitting on a railing, their mouths gaping open for food. Soon they shrieked in chorus. Up in the air far above came several mother swallows, each with an insect in her beak, and without the slightest hesitation in her course, she darted down from the height and popped the insect into her baby's open mouth! Birds must have wonderful precision of sight! [1]

It is in the Mammals that we get the highest type

[1] Visits to a bird gallery (Natural History Museum, South Kensington; Booth Museum, Brighton, etc.), where the specimens are arranged in cases representing, in model, the natural haunt and nesting-site of the type, showing male, female, and nestlings, are often helpful in lieu of opportunity of making first-hand acquaintance with many of our feathered friends.

of maternal care, for not only are the young retained within the body of the mother for their early days of growth, thus ensuring greater safety and constant temperature of environment, but after birth she makes provision for nourishment.

Many of the mammals which have become domesticated to man's use have, through their domestication, become altered somewhat in their ways from what is inherently characteristic of the wild type. In the wild condition the creature had much to do; the satisfaction of hunger was no easy task and involved arduous search, long journeys, frequent warfare, and then, perhaps, resulted in the minimum to satisfy his needs. Under domestication, these creatures are relieved of the necessity of finding food, for they get it in plenty, without effort. They have no need to protect themselves by speed or battle from their enemies, and thus under this long dominion of man their natural instinct has in many ways become altered. Particularly is this so in connection with the racial functions, for the relief from other obligations of life tends to release more energy towards these functions. Consequently we find that the definite breeding-season, which is typical of the wild animal, has become lost to a great extent among those that are domesticated, and in many cases reproduction may take place at various times during the year.

We are already grasping the idea that the success and perpetuation of the species may be ensured in two ways, either by a large number of offspring and great risks attendant upon their development, or a fewer number of offspring, and greater parental solicitation to lessen the risks of non-survival.

This principle is seen fully worked out in the case

of the mammals. Moreover, if few offspring are to be produced, fertilisation must be very sure, and here, again, in mammals we see a special adaptation, for in order that fertilisation may be accomplished with as little risk as possible, the ova are fertilised within the maternal body; and again, for safety of accomplishment, a special organ is developed in the male by means of which the sperms may be transmitted successfully. This is the spermatic duct leading from the testicles and enclosed within a strong muscular sheath, which again, with nature's wonderful economy, is made to enclose a second duct, the urethra, from the kidneys, and in all but the lowest mammals the two ducts fuse, one serving the purpose of both. When fertilisation is to take place, this organ, by automatic nervous stimulation, effects introduction of the spermatozoa. As the eggs leave the ovaries, one or more, as the case may be, may be fertilised, fix themselves on the wall of an enlarged portion of the oviduct, known as the uterus, and there remain during their period of prenatal life. The fertilised egg becomes surrounded in a double membrane; from the wall of the uterus to which it is fixed by the placenta, it receives nourishment from the maternal blood stream, in this way growing for a period, which varies in length with different mammals. This period of growth within the uterus or womb is known as 'gestation.' In the elephant it is 600 days, in the rabbit 30, in the sheep 150, in the dog 60, and in man about 280 days.[1]

When the developed egg, known in its earlier stages of growth as the 'embryo' and in its later stage as the 'fœtus,' is ready to be born, the walls of the uterus

[1] Thomson and Geddes, *Evolution of Sex.*

contract and the fœtus is liberated therefrom, passing down the vagina (*i.e.* the canal leading from the uterus to the external surface of the body), and then begins its period of postnatal care. For the young thing just born is too helpless to look after itself; in some types it is born blind, weak, often without any hair, and the maternal care which has been exercised during its prenatal life is continued in another way. The stream of nutriment is now no longer needed to be directed towards the uterus for the nourishment of the embryo and the fœtus, but is directed towards the mammary glands, which, during the period that it is required, have the power of extracting from the blood the necessary constituents of milk.

Some of the mammals are very helpless at birth, others are particularly vigorous. Rats are blind nearly three weeks, though they are able to wash themselves at about the end of a week or ten days. They have no fur when they are born, and are altogether weak, helpless little things, whereas the guinea-pigs are much more sturdy. In two days they can generally begin to feed themselves, but there is an interesting comparison to bring out: the rat's long period of infancy is associated with its higher intelligence; the guinea-pigs are proverbially stupid.

This care of the young during their early stages of growth may well be realised as a partial expression of the racial instinct which, before conception (that is, fertilisation), has manifested itself in other ways, perhaps vocal, as in the cats and dogs, perhaps physical, as seen in the antlers of the stag, of the red-deer, and of both male and female reindeer, which are cast as soon as the breeding-season is over, and do not develop until the

approach of the next mating-time: then they grow very rapidly to full size.

Of course, it will not be necessary to go into such detail as has been given here, in instructing children. At the same time, those who have the privilege of opening the young mind to the wonders of life should thoroughly understand their subject themselves, and should be prepared to give definite information should the child seek it. With little children, reproduction in the mammals may be taken in a simple way, as was suggested in the early part of this chapter, as a means of explaining motherhood, but with older children they both will desire and ought to know more.

It is well that children should keep pets—tame rats, rabbits, mice, guinea-pigs, cats, dogs. All help very greatly. Many parents do allow their children to keep these pets in the vague notion that "it is good for them to do so," but they, perhaps, have not a real appreciation of the amount of good that these may do, not only in the incidental way in which it can lay out a route towards matters concerning human sex, but because of the great moral advantage that may accrue through the children themselves being held entirely responsible for the feeding, the care, and the general hygienic well-being of the creatures under their care.

A visit to the South Kensington Museum of Natural History may be of inestimable value, and will probably do much to enlighten the child without any great amount of explanation being necessary. Here one may see the grades through which mammalian maternal care has evolved. The Duckmole or Duck-billed Platypus (*Ornithorhynchus anatinus*) and the Spiny Ant-eater (*Echidna aculeata*) are natives of

Australia and Tasmania. Both are mammals, with simple mammary glands only, and both lay eggs. The duckmole lays two eggs at a time in a sort of nest in the recesses of its burrow; here the eggs hatch, the young having to break their way through the strong leathery shell. The spiny ant-eater seems to form a link between the duckmole and the kangaroo, the egg being carried in a temporarily developed pouch in which hatching occurs and behind which fold the mammary glands are situated. Then we come to the Kangaroo, a typical marsupial, which brings forth its young in a semi-developed condition after five weeks' gestation, but in this helpless condition they are transferred to a pouch on the abdomen, carefully fed and reared till they are strong enough to fend for themselves.

The American Opossums represent still one stage further. The young are less helpless than those of the kangaroo at birth, consequently few members of the opossum family continue to nurture and carry their young in a pouch. Yet the necessity for maternal solicitude is not entirely absent; the little ones are still dependent upon their mother for safety. So she carries on her back her little ones, who keep themselves firm by linking their tails round hers.[1]

[1] The particular value of these museum specimens lies, of course, in the fact that they are always available, and that, as they are arranged in the Natural History Museum, South Kensington, they illuminate the story of Mammalian reproduction most helpfully. But, of course, a wider educational value comes in the study of living animals, and here the keeping of pets aids so greatly; while in Zoological Gardens and sometimes in Parks, many animals and their young are often to be seen—a source of delight and wonder. Specimens of each of the above animals, together with eggs, or young, as the case may be, are to be seen on the second floor, Natural History Museum (Mammalian Room), South Kensington.

CHAPTER VII

Further Aids towards Understanding the Biology of Sex

In the foregoing chapter we have endeavoured to outline in some way, how simple nature study may be utilised to provide a background for reference such as may aid the instructor in explaining to children matters of sex.

I do not think by any means that it will always be necessary to rear every type indicated in the graduated scheme outlined, for, once one has the necessary facts concerning the principle of fertilisation and of sex differentiation, and when one has the correct simple terminology to use, it will frequently be sufficient to describe briefly the reproductive process.

It is quite likely, for instance, that one may keep sticklebacks in an aquarium yet not be successful in getting them to breed, but the story of the stickleback's courtship, nest-building, and family life may very well be told so as to complete, in some measure, the study of this interesting little fish.

Although in the foregoing chapter, in view of the general purpose of this book, the racial functions and their method of achievement have been dealt with fully, in nature-study work, such as might be carried out at home or in the school, it is most important that,

while appreciating the fact that the racial functions are the most important and the influence they exert over the organism is the most potential, the reproductive process should receive no over-emphasis; it should merely receive a proportionate amount of attention to that which is given to the other functions of the organism and to the study of form, of adaptation to environment, of habits; and to such experimental work as can be easily introduced in school. For this reason I have indicated, in the foregoing chapter or in the Appendix, other points of interest which may well find a place in the ordinary study of types, and although the scope of this book hardly allows me to enlarge in this direction very greatly, capable teachers of nature study will easily be able to carry out some of the suggestions.

Frequently has it been the custom in school to study animals, yet to exclude from this study the method by which the species is carried on, although habits and family life receive a good deal of consideration; and the suggestion embodied in this and the foregoing chapter simply comes to this, that instead of excluding the racial process it should be systematically included in the general work.

The biologic approach is extremely valuable in that it supplies simple facts and places at our disposal a suitable terminology; it gives a completeness of survey to the mental outlook. Well, tactfully and sympathetically taught, such nature study has tremendous power, enlarging and expanding the child's sympathy and interest with nature. There is great moral value, too, for the training in responsibility which is afforded by making the children responsible for the care of animals and of plants, may make an early foundation for the acceptance of later responsibilities which life may

bring before them. We cannot expect young children to feel any sense of responsibility for those who are older than themselves, nor for those who are of the same age and strength as themselves, but we can expect them to take an intelligent interest and to feel a sense of responsibility towards those who are younger and more helpless than themselves, and this is why the care of animals and of plants may be of great value in moral training.

If such work in nature study is dealt with on the lines indicated, it should form a very useful introduction to later work in physiology and hygiene, which subjects, indeed, should be regarded as applied biology. Again, it should yield many opportunities of touching upon the subject of heredity, although not with any degree of detail, nor is it advisable to attempt any depth of treatment. Some things are so obvious that we do not appreciate them. We get little masses of eggs laid on the water-weed by the water-snail (*Limnæa stagnalis*), and we accept the fact that these small eggs grow up into little snails like their parents, but if we pause and ask ourselves, "Why is it that those eggs grow into snails (*Limnæa stagnalis*) just like their parents? Why do they not grow into Planorbis snails or into water-beetles? What is it that determines that each tiny mass of protoplasm should develop into a creature just like its parent?" A new thought comes into our mind. The poppy seeds are very small, mere grains, and yet within each tiny seed there is that which can grow into a green plant with hairy leaves of wavy outline, with four red petals to its flowers, a curious calyx which has the habit of dropping off as the flower opens, and black stamens round a green seed-box, which, in turn, can grow into a fruit and produce seeds and scatter them

just as the parent poppy did. "What is it," we can ask, "that determines this—that can exert so great a directive force within so small a mass of tissue?"

Not the least value of nature work is the psychical reaction that it may bring. The element of wonder creeps in and bids the unfolding mind expand. The tender emotions are stirred. The child's mind is constantly appreciating, unconsciously, the invisible forces of growth, and it is quite possible that such coming into mental contact with unseen power may help in later life, when the mental outlook has to be adjusted to the conception of psychic force and has to assume the existence of the spiritual.

It will be quite obvious that a thorough scheme of work, carried out with all the advantages of pedagogical method, could only be achieved at school or under a careful pedagogic direction. It will be equally obvious that the intimate details concerning human life should ideally be conveyed to the child by one or other of the parents. So if such work is to be thoroughly successful, and thoroughly valuable to its aim, it is essential that the home and the school should work together in sympathy, that the home should know of the work being carried on in the school, and that the school should have every sympathy and support from the home.

To this end, I would suggest that parents should be informed of the sequence of nature-study lessons to be given week by week, and that each week a short résumé of the lessons be sent to the parent. A parent, so informed, would naturally take an interest in the child's school-work, and would ask questions concerning it, show sympathy with it, and engage the child's confidence. In this way, it seems that questions arising

in the child's mind would almost inevitably fall to the lot of the parent to answer, and when the first question had come, an opportunity would also come of impressing upon the child the fact that for any further difficulties that it should want solved, or for any further information, it should come again to mother or father. "Because these are very important things that we should know; they are very grand things. We do not talk to everybody about them, but only to those we love best, because they are the best things we can know; you love mother and father best, and so only talk about these things to us."

Nature study in the school may be conceived as supplementing and extending elementary knowledge of and acquaintance with organic life which children may gain at home, and in regard to the question of sex instruction, we may take it that such definite work carried on, on good pedagogic lines in school, will do much to give depth and solidarity to teaching at home. One can hardly expect that the average parent will be as well equipped with nature lore as the well-trained teacher, and it may be that, for want of sureness in knowledge, parental instruction may have a tendency towards a sentimental treatment of the subject. This, however, should be obviated if the school and the home work together harmoniously, leaving no suggestion of superficiality.

The inspiring thought throughout this work should be that, through it, children may be led to realise that all living things have two obligations to fulfil, duty towards themselves as individuals and duty towards the race; and towards the fulfilment of these obligations, the plants proceed automatically, the lower

animals proceed instinctively, and man proceeds in an instinctive way, but because he has the great gift of reason, and the power of choice, he is able to raise himself far above the level of the animals.

The æsthetic value of nature study is very great: the inquiring spirit is easily fostered in young children, but the soul to see that which is beautiful, and to know that it is beautiful, is a later growth. In nature-study work it is found that movement in animals appeals first to the child's mind. Children of six and seven are far more interested to see the way in which a fish swims or a bird flies than to study its colours or delicacy of outline. Yet the wise teacher, who understands the art of teaching a little child, will find many ways of stimulating appreciation of the beautiful.

Before passing on to the possibilities of biologic work in secondary schools, one would indicate that, by certain simple experimental work on Moulds, it is possible to do something to prepare a background such as will illuminate later instruction in hygiene. It is possible to arrange a very simple series of experiments on the growth of moulds [1] which will bring to light the facts that dampness and darkness and stagnant air tend to encourage the growth of these plants, and that sunlight and fresh air tend to restrict their development, and also, by a simple arrangement of experimental work, it is easy to show how ubiquitous germs and spores may be. Another simple little observation that may have some value in driving home an associated idea is made when two lots of seed, *e.g.* beans, are grown under identical conditions, but with this difference, that one set of seeds has been soaked in water till it has become

[1] See Appendix.

covered and impregnated with bacterial slime, while the other set has been soaked for a short time only. A comparison of the way in which these two sets of seeds grow shows that the healthy seeds grow up into fine sturdy plants, while the diseased ones do not develop at all, or, if they do develop, become very poor, weakly little plants.[1]

A simple example like this may serve to bring home the idea that young lives are very easily injured, and that if they are injured by disease before they are born they are little likely to grow up healthily and well.

In the elementary school, opportunity and resources of equipment do not usually allow of much further extension of nature-study work than has already been outlined; indeed, in the upper standards, nature study is more often left out of the curriculum. It sometimes gives place to physiology and hygiene, or to a series of lessons on "Health and Home"; but it would be better if these subjects were not allowed to displace nature study, but rather were taken in addition.

In the secondary school, where specialist teachers are responsible for various subjects, and where biology, botany, zoology usually find a place in the curriculum, there is further opportunity of extending the mental horizon and of substantiating early knowledge.

The study, carried out with the use of the microscope, of the lower forms of plant life allows of an acquaintance with the primal reproductive elements, the egg and the sperm. Seaweeds are particularly useful for this, for not only, if taken at maturity, may the egg-cell (ovum) and the sperm-cell (antherozoid) be recognised, but the actual process of fertilisation may be observed.[1] Some of

[1] See Appendix.

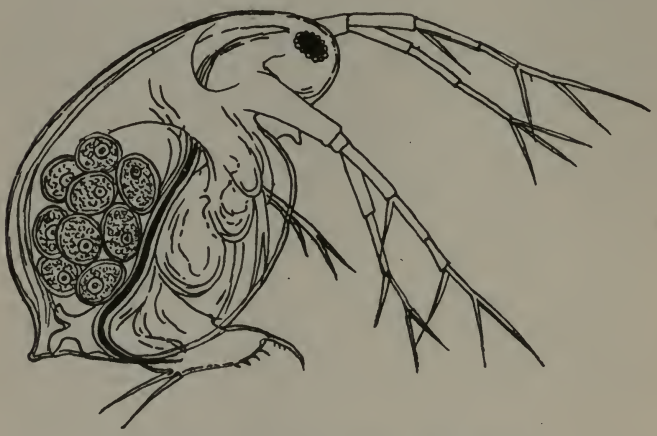
the filamentous algæ are also useful in this way. The first stages of development, too, may be easily seen. Here again, the seaweeds are found to be useful, for frequently the first divisional processes of the fertilised egg-cell may be watched under the microscope.

Another interesting bit of observational work in embryology which may be carried out quite simply is the development of the water-snail or of the slug. Each of these may be watched under the microscope if the spawn of the water-snail, or the eggs of the slug, be placed in a watch-glass of water, and observed. To see the embryo pulsating with life and performing definite rhythmical movements within the egg-wall has the same awe-inspiring effect as has a sight of a minute water-flea when, under the microscope, the heart of this tiny creature, in itself just visible to the naked eye, may be seen to beat.

Showing fertilisation in the seaweed. The ovum is being surrounded by antherozoids, one of which will effect an entrance and fuse with the nucleus.

Some of the water-fleas are valuable also in another direction. These creatures are minute crustaceans, to be found in pond water darting vigorously hither and thither, or in winter-time moving slowly over the mud at the bottom of the pond. Daphnia and Simocephalus both have a carapace compressed laterally. They move by vigorous darting movements through the water. The heart is towards the dorsal surface and, in the brood chamber, just under the dorsal edge of the carapace, the mature female may be seen to be bearing one or more

large eggs. This is a valuable illustration, and sufficiently remote from man to be explicit without being stimulative. Cyclops, another minute crustacean, is not compressed laterally; its body is more definitely segmented, and the mature female carries eggs in two egg-sacs



A WATER-'FLEA' (DAPHNIA) (ENLARGED).

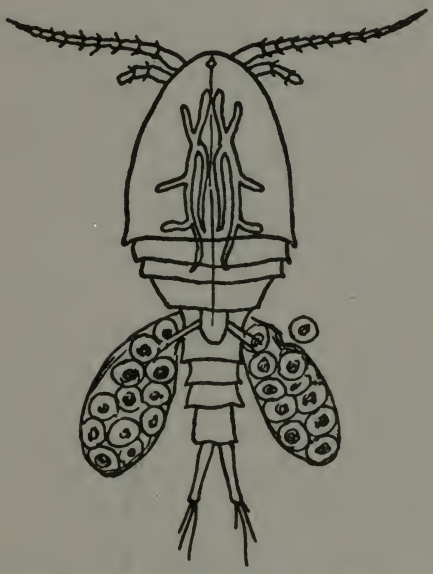
Showing eggs within the brood-chamber under the carapace. In this species, which may be $\frac{1}{17}$ of an inch long, the eggs are plainly visible with a hand lens in January and February.

attached to the abdomen: here the eggs are carried till they hatch.

Plant life forms many opportunities of dealing with physiologic and reproductive questions which will help towards the accomplishment of our aim in sex education, and particularly one may refer to how the study of the fertilisation process in plants may lead naturally to a knowledge of what hybridisation means,

An acquaintance with Mendel's work in connection with plant hybridisation should follow.

Gregor Mendel, born in 1822, was an Austrian monk who performed, in connection with plant hybridisation, certain experiments, and who drew from the results of



CYCLOPS—ANOTHER 'WATER-FLEA'—(ENLARGED).

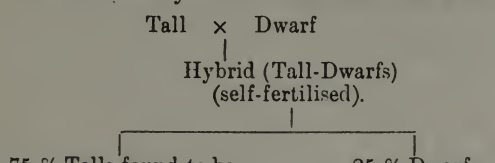
(Natural size $\frac{1}{12}$ inch.) Female showing egg-sacs attached to the abdomen.

these experiments certain conclusions. His results, however, published in 1865, were, curiously enough, overlooked by the biological world till the end of the nineteenth century, when they were rediscovered, and similar experiments in hybridisation were carried on

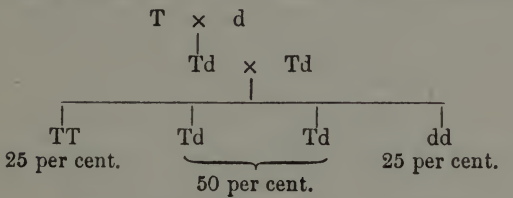
by many investigators; a whole new world of biologic research has been opened up.

Mendel's experiments were carried on with pea plants, these having constant characters in the several varieties, and also being very easy to manipulate for cross-pollination. He pollinated flowers of a tall variety with the pollen from a dwarf variety. The seeds resulting he collected and germinated; all the plants from this generation were tall, in spite of the fact that one of the parents was dwarf. These plants, in turn, produced flowers; these were pollinated among themselves, that is to say, the hybrids were fertilised by their own hybrid pollen. The seeds resulting from this were all collected and germinated, and the plants now obtained were found to be, some of them tall and some of them dwarf, the proportion of talls to dwarfs being three talls to one dwarf. So it is seen that the dwarfness, which was characteristic of one of the grandparents, and which, though not apparent in the first filial generation, reappeared in the second filial generation; so, evidently, the dwarfness, although not apparent in the hybrid, was present, though in a latent or obscured condition. A character which may be obscured in this way is spoken of as 'recessive,' the obscuring factor or character being said to be 'dominant.' But, further, it was found that if the dwarfs were self-pollinated all their offspring became dwarf plants, that is to say, the dwarf was a pure strain: and when the talls were self-pollinated, one quarter of the whole number produced tall plants only, that is, they were pure talls; while the remaining two quarters, self-pollinated, were found to be hybrids, for they produced talls and dwarfs again in the proportion of three to one. Mendel's

finding may thus be expressed in the form of a chart for the sake of brevity and to show the connectedness :



Or, using symbols, 'T' for 'tallness,' 'd' for 'dwarfness' :



Such was Mendel's early experiment. Other experiments were carried out in connection with other characters and in connection with combination of characters, and, since the rediscovery of Mendel's work, research in connection with the transmission of characters from one generation to another, has been carried out in many branches of vegetable and animal hybridisation.

The ordinary scope of work in the secondary school hardly lends itself to a very extensive or indeed to more than an elementary acquaintance with Mendelian inheritance, but the important fact to be brought home is this, the fact of possible recessiveness, that a character may be rendered latent and may crop up in succeeding generations.[1]

[1] See *Mendelism*, by Punnett, published by McMillan. *Recent Progress in Variation, Heredity, and Evolution*, by Lock, published by John Murray. *Heredity*, by J. A. Thomson, published by Murray. In

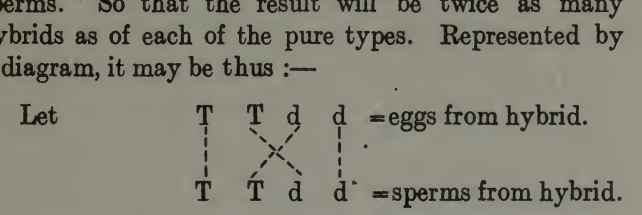
Mendel offered a suggestion for the explanation of these happenings. Taking the case of the hybrid tall peas, in the first instance, the parent tall plant was of a pure strain, that is to say, all the germ-cells produced by that plant (whether they be ova or pollen grains) carry within themselves and transmit the capacity for growing into tall plants—conveniently expressed, they bear the 'factor' for tallness. The dwarf parent plant, likewise of a pure strain, produces germ-cells, bearing only the 'factor' for dwarfness.

When, however, a germ-cell of the tall plant unites with a germ-cell of the dwarf plant, the fertilised egg so formed contains both the factor for tallness and the factor for dwarfness; though when it germinates it grows up into a tall plant.

Mendel's theory in regard to this hybrid tall plant is this: that its germ-cells (both pollen grains and eggs) bear the power of growing up into tall plants *or* into dwarf plants. That is to say, they bear the factor for tallness *or* for dwarfness only, and, further, Mendel held that half the germ-cells produced contain the factor for tallness and half of them contain the factor for dwarfness. When, therefore, this hybrid is self-fertilised, and half its eggs bear the factor for tallness, half for dwarfness, also half its pollen grains bear the factor for tallness and half for dwarfness, the chances are that these germ-cells will fertilise one another in the following proportion: Half of the 'dwarf-bearing' eggs may meet half of the 'dwarf-bearing' sperms, and half of them may meet 'tall-bearing' sperms. Similarly

the Central Hall, South Kensington Museum of Natural History, there are several exhibits representing Mendelian inheritance—guinea-pigs, varieties of maize, mice, pigeons, peas, etc.

half of the 'tall-bearing' eggs may meet 'tall-bearing' sperms, and half of them may meet 'dwarf-bearing' sperms. So that the result will be twice as many hybrids as of each of the pure types. Represented by a diagram, it may be thus :—



Dotted lines indicate chances of fertilisation, resulting individuals will be represented by :—

TT, Td, Td, dd.

As an instance of the way in which new varieties have been obtained, take the following :

Some pea plants have seeds that are characteristically round, and others have seeds characteristically wrinkled, 'roundness' being dominant to 'wrinkledness.' Again, this round variety of peas has yellow seeds, and the wrinkled variety has green seeds. When these two varieties, the round-yellow-seeded and the wrinkled-green-seeded, were crossed, the result was offspring all bearing round yellow seeds, that is, like the dominant plant.

These hybrids, on being fertilised, are found to yield some round-yellow-seeded plants, some round-green-seeded plants, some wrinkled-yellow-seeded, and some wrinkled-green-seeded.

The actual proportions in which these are found are : nine round-yellow to three round-green to three wrinkled-yellow to one wrinkled-green.

9 RY+3 Rg+3 wY+1 wg.

So that it is apparent that here, in this generation, two new combinations of characters are obtained, namely, a round-green-seeded plant and a yellow-wrinkled-seeded plant.

Biology finds a place in the ordinary scheme of work in many, if not most, girls' schools, although generally more attention is given to plant than to animal life. It is greatly to be regretted that biology finds so small a place in many boys' schools, for the knowledge it can supply, and the mental equipment it bestows, are invaluable in the way in which they lead to an understanding of life.

In the secondary school, the course of biologic work should be made to lead up to an acquaintance with the doctrine of evolution. It is easier to introduce this subject to the adolescent mind if one has certain facilities in the way of early acquaintance with plant and animal life to draw upon, by way of illustration.

The evolution theory is an attempt to explain how the various forms of life now inhabiting the earth have come to be what they are. Manifold are the creatures, infinite the varieties: profuse are the resemblances, constant are the differences. How have all these differences come to be? How have the resemblances established themselves? These are questions which the evolution theory attempts to answer.

The cat resembles the tiger in so many ways that we are bound to recognise a relationship between them: yet just as constantly the cat and the tiger differ from one another in certain features; there is no confusion of the species 'cat' with the species 'tiger.' Similarly in the plant world, numerous relationships, yet involving constant distinctive features, immediately range them-

selves before the mind's eye: the sweet-pea and the laburnum, the mushroom and the toadstool, the pansy and the violet, the wheat and the barley.

The earthworm with its simple body-tube of simple muscle fibres, with its elementary digestive system, its rudiment of a nervous system, its 'hint' of a brain, its mere beginnings of a respiratory mechanism—is altogether an inelaborate form of animal life, seemingly very far removed from the frog, the fish, and the bird. Yet compared with the one-celled organism, the amœba, the earthworm itself is a monument of complex organisation. Even the untrained eye can recognise and appreciate the fact that animate objects vary greatly in their elaboration of structure, and can recognise the lowly and the high; while the trained mind of the biologist discriminates so finely, that it arranges the animal kingdom in a genealogical tree, showing the stages in progressive elaboration from the lower to the higher types.

The evolutionist holds that all types are descended from simpler though similar types, that minute, gradual, or sudden changes in organic condition have arisen as permanent and transmissible modifications; that, to return to our illustration of the cat and the tiger, far back in the æons of the past, neither the cat nor the tiger as we now know them inhabited the earth, but that their common ancestor, essentially cat-like and equally essentially tiger-like, prowled, and that, from that pre-cat and pre-tiger type two lines of divergence arose, one culminating in the cat as we now know it, and the other in the tiger. As to the ultimate beginnings of organic life, the biologist can only postulate, and he does postulate the existence of simple living organisms

as a beginning to the tale of evolution, and holds that from these initial simple forms of life, by a gradual accumulation of 'betterments' and an elimination of types possessing 'weaknesses,' an infinite variety of living creatures has come to people the earth. The phrase 'accumulation of betterments' needs elaboration. Variability is a great fact: within the members of one family only, many slight differences occur; no two children of the same parents are exactly alike: no two kittens in the same litter are identical; and though the variations in many of the lower forms of animal and also of plant life may be less obvious or even undetectable to the casual observation of the untrained eye, they are recognisable to the trained eye, and commensurable. The shepherd can identify each lamb in his flock; the botanist with his special aim in view, can individualise his plants. The ubiquity of variation is complete. Many variations are of a type useful to the creature, aiding it in meeting the conditions of life more successfully; other variations may be, so far as can be judged, of indifferent value; while yet again variations may arise which are of a distinctly disadvantageous nature. Creatures so handicapped with disadvantageous variation will, under the natural conditions of struggle which predominate existence, be eliminated; creatures possessing a useful variation will tend to succeed in the struggle for existence, and if their variation is of a transmissible type (as many variations are) will reproduce their variational type; and, further, in the event of pairing with a similarly varied mate, will tend to strengthen and increase the valuable variation. And by such 'accumulation of betterments,' continued over long periods of time, natural organic

progress, *i.e.* evolution, has been achieved. It is to Charles Darwin our thoughts turn in connection with this Doctrine of Descent: not that the idea originated with him; the evolution idea has been part and parcel of philosophic thought ever since the days of the early Greek philosophers, but it existed as a philosophic idea only, as such finding a place in the thought of succeeding ages. It was only towards the end of the eighteenth century and the beginning of the nineteenth, that biologic thought attempted to assert a scientific substantiation of the doctrine of descent, when Lamarck, Buffon, and Erasmus Darwin, and some others, came forward with speculations as to the cause of variations and of consequent evolution. But it is to Charles Darwin that we owe, as Professor J. Arthur Thomson puts it, "the first successful vindication of the evolution idea." [1]

In his *Origin of Species* (1859) he brought together a vast series of facts and observations which bear out the evolutionist idea. He pointed out the fact that under domestication and by man's careful selection many organic types (animal and plant) are in process of variation and evolution at the present day, and that, as man selects consciously, and so fixes varieties, so has Nature 'selected' and fixed in the long process of time. He called attention to the anatomical resemblances to be found among a series of animals—the forelimb of man, the bat, the dog, the seal—all essentially similar in structure yet each modified to perform a special function, and sees a reasonable explanation for this conditional variation of the forelimb in the assumption that all four have descended from a single ancestral

[1] *Darwinism and Human Life*, J. Arthur Thomson, p. 17.

type, from which four different variations have been cumulatively intensified in process of time. The geological record of fossils—the story which the rocks unfold—shows very clearly that types, different from yet related to those now existent, have inhabited the earth in past ages, and some of these relics supply a close series of links between the past and present forms.

The geographical distribution of species leading in many cases to racial isolation, is only to be explained by the theory that at some period earlier in land formation, a common type became severed from the mainland (*e.g.* the animals peculiar to Australia, the special varieties of birds and plants to be found on certain oceanic islands), and thereafter diverged along its own specific lines of evolution.

In the history of the individual itself there is more than a suggestion of evolutionary progress. The fertilised egg strongly suggests the unicellular animal, and in its progressive stages of growth from the egg to maturity, suggests the several typical creatures which lie behind it (or below it) on the genealogic tree. The frog, for instance, begins life as a fertilised egg, a single cell, speedily becomes a ball of cells, elongates, suggesting a worm-like condition, rapidly becomes possessed of a backbone, as a tadpole reveals its fish ancestry, then finally discarding past biologic habit, becomes a frog. Even the mammalian embryo, beginning as a one-celled creature, passes through a similar, though less emphasised, recapitulation of its racial history, showing, for example, at one stage a hint of gill-slits, though they have no respiratory function.

These are, briefly, some of the ideas so carefully

elaborated by Darwin in his *Origin of Species*, and extended later by other biologic thought.

With the origin, cause, and perpetuation of variations speculative thought has always been intensely concerned. The perpetuation of variations, *i.e.* transmission from one generation to another, is accounted for by the fact of inheritance, that is, those methods and processes by which the constitution and characteristics of the parents are handed on to their offspring. And the operative factor which determines which variations shall be transmitted ultimately to become specific characteristics, Darwin, basing his ideas upon (*a*) the widespread variability of organisms and (*b*) the tremendous reproductiveness which leads to keen struggle for existence in organic life—called ' Natural Selection.' In this struggle for existence, those organisms which were possessed of a variation favourable to meeting the struggle would tend to survive and pass on their advantageous trait : those less favourably adapted to meet their environment would tend to die out. Natural Selection, recognised as it is, as a factor of predominating importance in the determination of evolution, is, however, no longer held to be responsible for all cases and conditions ; certain difficulties stand in the way of its universal application.[1]

Variations themselves may be of sudden distinctive appearance (*e.g.* the curious origin of ' Shirley ' poppies : these plants are all the descendants of one flower found in a garden clump of wild poppies in 1880),[2] or they may be of comparatively small beginnings and intensified by

[1] The reader is referred to the literature on Evolution, given in the Bibliography.

[2] Lock, *Recent Progress in Variation, Heredity, and Evolution.*

consecutive transmission, fostered by fortunate environment.

'Modifications' are changed conditions which arise in the individual, due to some circumstance of use, or misuse, or environment. These are known as 'acquired characters,' and are generally held to be concerned with the individual only, and of no racial importance, being intransmissible. The Lamarckian theory of evolution assumed the transmissibility of acquired characters, but there is, up to the present, no convincing evidence of this.

To summarise briefly: Of organic evolution we can recognise that what a creature is now, is the product of its hereditary endowment, its reaction to its environment, and its exercise of function. The central thought of the doctrine of evolution is one of progress: that, as Professor J. A. Thomson puts it, "the present is the child of the past and the parent of the future." Not only in regard to physical life is this doctrine accepted: mental processes, emotional life, social conduct, and ethical ideas are all recognised to have evolved to their present degree and condition.

CHAPTER VIII

Ethical Training

Sex education may be accomplished in part by the giving of definite information regarding those processes by which life is transmitted from one generation to another; such an acquaintance with the many phases of Nature's workings is bound to have an automatic reaction upon character formation,[1] widening the mental horizon, intensifying love of the beautiful whether it be in form, in colour, or in function, infiltrating the soul with constant mental contact with the invisible forces of growth. But valuable as this knowledge may be made, according to the spirit of the teacher, it is not all-sufficient. Sex hygiene is not only an affair of the body; it is an affair of the mind. There is a psychic as well as a physical relation to consider, and the psychic is even more important, though it cannot be wholly effective if divorced from the physical.

[1] "And from the fixed place of Heaven she saw
Time like a pulse shake fierce
Through all the worlds."
"The Blessed Damozel," D. G. Rossetti.

Some girls in a literature class were asked to explain this passage. They found it difficult, but one commented, "I can't quite explain, but I should think she would have somewhat the same feelings and attitude as I had when, through the microscope, I watched the heart of a small water-flea beating."

Who would seek to instil an ideal of right sex conduct must not be of a lower ideal himself; he must view sex aright, and, with a personal irradiation of uprightness and integrity he must be enabled to carry conviction into the minds of those—whether they be children, adolescents, or adults—whom with sympathetic insight, he would guide. "Children are . . . inevitably suggestible," says McDougall, "firstly because of their lack of knowledge and lack of systematic organisation of such knowledge as they have; secondly, because the superior size, strength, knowledge, and reputation of their elders tend to evoke the impulse of submission and to throw them into the receptive attitude." [1] If, then, the adult has his own vision of sex clouded and be-mirked, the impression will reflect itself upon the childish vision also, veiling in grey, or even in black, what should shine forth in white. To the pure, sex is pure: the little child's questions, vague or searching, crudely expressed though they may often be, are pure. To the elder's task be it added to maintain, foster, and enhance the purity.

We have learnt the fact that all living organisms reproduce their kind; the lowly ones, for the most part, reproduce by the simplest possible method, that of dividing into two, so the parent becomes merged into two offspring. Sometimes in these lowly creatures two organisms unite—'conjugate'—and so become merged into the new generation. But such simple means of reproduction is found in the lowest plants and animals only. Above these lowest types, the reproductive plan is carried out by the liberation from the parent of simple one-celled parts of itself. These

[1] *Social Psychology*, p. 100.

one-celled parts, in the lowest types, are similar in shape and constitution: they are called 'gametes.' When two gametes conjugate, the resulting organism is an 'embryo'—the first stage of the new generation. Simple conjugation of two similar gametes is, however, quite relegated to the lower forms of plant (some of the algæ, *e.g.* Spirogyra) and animal life (*e.g.* Paramœcium), though it is not, by any means, the only method of reproduction found even among these lowly forms. Many of them liberate dissimilar gametes, the one inactive, comparatively bulky, the other small in bulk and exceedingly motile: the former is known as the 'egg' or 'female gamete'; the latter as the 'sperm' or 'male gamete.' Here we have the beginning of 'sex,' and the beginnings of sex behaviour. The slight, active sperm is attracted by the more passive, alluring egg. The attractiveness of the one and the susceptibility of the other are the initial cause of sex differentiation. A higher stage of evolution shows us the liberation of the differing gametes by differing parents, an allocation of the one type of parent to the one type of gamete, that parent which produces male gametes (sperms) having in many respects characteristic distinguishing behaviour when compared with the parental organism which produces female gametes (ova). The essential quality which leads to the attraction of the sperm by the egg (and thus fertilisation is assured) passes also to the parental organism responsible for the production of eggs or sperms as the case may be, so that, in order that the sperms and eggs may be brought within effective reach of one another, Nature has decreed that the parental organisms themselves shall be mutually attracted; and in the gratification of sex desire in the

individual the success of the species is assured. Reproduction is carried on essentially to the cost of the individual: sex desire is essentially egoistic, selfish. In the lower animals sex desire—the sex impulse—predominates periodically only, and during the intervals between the non-racially-directed periods, is latent. But in man, on his higher plane of evolution, it is not so. Sex desire forms a more or less constant constituent of his functional years of life. From his behaviour in meeting the claims of sex—the egoistic—and of race—the altruistic — emerges social conduct. Unbridled yielding to the pressure of sex desire is thoroughly antisocial. It is for each to decide whether his conduct shall be only selfish or whether it shall be imbued with unselfishness which shall make for the highest social integrity. The high degree of evolution which civilised man has attained in his emotional life is compensatingly attained in his intellectual life: he has the power of reasoning and the gift of choice. Out of these comes forth his great responsibility. For, in sex is the fundamental mainspring of all that we prize—home-life, family-affection, father- and mother-love, and all that it provides, love, courtship, marriage; it is the inspiration and cause of manliness and womanliness—and bound up in all that so concerns the individual, is the welfare of the race. We cannot, then, view sex itself awrong when we regard its fundamental initiating power.

But the greater the gift, the greater the responsibility it brings with it, and the greater the possibility of failure: the farther the pendulum may swing to the right, the farther may it swing to left. And herein lies the tragedy of sex—that, uncontrolled or misguided, it may prove a curse; or denied a sublimated outlet,

it may be cramped, crushed, only to break out in some abnormal guise or perversion. The bond that brings man and woman together, that may merge into lifelong companionship, founded on mutual interests and love, is the supreme gift, the gift that should be preserved in its entirety till the highest call bids it come forth. But the preservation of this gift may be, to many natures, a task of no small difficulty: the temptations to squander it or to misuse it are legion. Success in meeting the temptations which social life imposes will largely depend upon power of facing and overcoming temptation; it is largely a question of self-control. The sex emotions are stronger in some natures than in others; on the whole, they are more direct and violent in the male than in the female. The variability of the temperamental factor, however, must be borne in mind: what constitutes a severe test for one nature impinges upon another nature without making any impression. In general, too, it must be remembered that the strong, self-reliant natures are often those which are accompanied by the strongest sex impulses, but that, while a weaker nature would seek help and would confide its difficulties, the stronger, self-contained nature will keep its difficulties to itself, and may, through lack of a counsellor, have a needlessly hard struggle imposed upon it. Sympathy with child-life and with adolescent nature should guide elders to render tactfully the help which may be so much needed.

The disturbing power of the sex impulse may be very strong, and temptations to yield may be severe. Witness the effort of will necessary to overcome the habit of self-abuse; witness the difficulty that faces adolescents of keen, emotional nature who may be anxious to pre-

serve pre-marital chastity; witness the task imposed upon the man or woman who, because someone is dependent upon them, cannot afford to marry. Marriage itself should not be regarded as an opportunity for unbridled sexuality; it calls for mutual restraint and regard—a point which should be well driven home, especially in the training of youths. Take again the case of husband and wife who would observe the sanctity of pregnancy. Girls who, often not knowing the depth of impression which their actions and conduct may create, would pander to their vanity, their love of 'creating an impression,' are called upon, in the light of sex control, to forego the pleasure which their desire to attract — an evolutionary product — may crave unconfinedly.

These are just some of the struggles which fall to the lot of most people, and which, if self-control be weak, though knowledge may be there, may be met inadequately or even unresistingly.

The fundamental impulses of organic progress are two—hunger and love. Hunger we guide, control, limit its gratification to subserve the needs of the body-nutrition—and bring into line with custom; just so should the sex impulse be recognised, controlled, and limited to subserve, in its twofold capacity of enhancing the individual and of ensuring the race, the function of reproduction. Indiscriminate yielding to the hunger impulse, when and wherever one may desire, regardless of whose property we may be stealing, is antisocial: similarly, unbridled yielding to the love impulse is antisocial.

We have already seen in an earlier chapter, how control of the sex impulse may be greatly aided by habitual

sublimation of sex energy. This thought forms a basis for much of our plan of supervision of child and adolescent life. We also saw in the same connection, how greatly the habit of self-control may be instilled in childhood. The relation of will-power to an upright sex life is manifestly of supreme importance. Will-power reacting subjectively leads to self-control. The supreme test of self-control is conduct in meeting an emergency, a sudden temptation. "The protection of youth from the dangers of sex," says Fœrster,[1] "is a question of power rather than of knowledge." That may be, but ethical training in regard to sex, without knowledge of the facts of sex, is hardly likely to be of avail. A boy of fifteen or sixteen, for example, knows that certain pleasurable feelings invade his consciousness, knows that they are part of his experience and of the experience of every other boy he knows. If he has no information as to their meaning, their relation to his future responsibilities of procreation, that these feelings are just the forerunner of what he should, in an ideal relation of sanctified marriage experience, and that to that end they should be consecrated—what reason has he for applying any ethical injunction towards self-control to these normal demands of his being, unless there is direct reference to them ?

Our educational system is frequently charged with neglect of moral education. One must, however, recognise that little good will be done by direct injunction, by 'lecturing': great good may come through direct information, providing a rational basis for conduct; indirect training in will-habit, indirect training in sub-

[1] *Marriage and the Sex Problem*, by F. W. Fœrster. Published by Wells, Gardner, Darton, & Co.

limation. The spirit of asceticism, which should be encouraged right from childhood by small acts of voluntary self-denial, will find its justification and reward when the storm-imperilled nature comes safely through. Lord Roberts, we are told, had a presentiment that the day would come when his services would be needed by the country, and when the Boer War was proclaimed, he told a colleague that for nineteen years he had led an abstemious life to be ready for it—through all those years he passed through a regimen of self-discipline in order to meet, when it came, the country's call efficiently.[1]

Self-discipline as a well-established habit will lead to moderation—temperance in all things. He who is luxuriously self-indulgent in food, habitation, pleasures, is likely to find self-restraint in regard to sex much more of a difficult matter than he who is more temperate in his ways of living. Of alcoholic intemperance from the racial point of view there is much to say; from the social point of view its effects are far-reaching and disastrous; both the results upon the race and upon society, however, are the outcome of alcoholic intemperance in the individual. Lack of judgment, weakened self-control, are the immediate results of intoxication, and if habituated, lead to deterioration of the moral fibre. The majority of those men and women, we are told, who have departed from the path of continence, made their first downward step when under the influence of alcoholic excitement, which, not only weakening the sense of discrimination between right and wrong, and inhibiting self-control, casts an exhilarating glamour over the circumstances and the consequences of the acts in which they are invited to take part.

[1] *The Times*, 16th November 1914.

While we should aim at achieving sex education very largely in indirect ways, complemented by biological, physiological, and hygienic instruction, it will of course be obvious that many adolescents who have not had the advantage of careful supervision and instruction, or who stand in particular need of help, may require direct information for the management of their sex life. Such young men and young girls often come within the reach of social or religious organisations, through which the appeal may be made. Youths and girls of this age are not inclined to accept moral injunctions blindly; they want to know why they should pursue the line of conduct urged upon them: will it be any advantage to them? They have probably learnt wrongly that continence is harmful to a man, and view the social diseases as of little or no importance to the individual; indeed, among many of them there is the idea that a boy is not a man till he has contracted one of these diseases. A correct view of sex should be presented to them; based upon an account of the rôle of the internal secretions, the possibility and the value of leading a continent life should be seriously impressed; recognition of the tremendous sway which the sex impulse may exercise should lead to a frank confidence in the teacher's broad-mindedness; then the relation of will and self-control to sex integrity should be brought forward prominently. Everyday life may, to the unfortified, present innumerable testing circumstances which may render restraint difficult. Various sensory impressions are liable to react upon the racial organs, and stimulate them to undue activity: more particularly does this stimulation affect the racial zone directly, in the case of youths and men. Obscene pictures, erotic plays and stories,

'suggestive' actions and costume in women, are among the causes giving rise to such sensory impressions, while many may be of a more subtle nature, *e.g.* certain aromatic odours, music, certain tactile impressions, as, for example, the 'feel' of fur, may each have an effect in individual and special cases. Now, it is very much a question of will-power as to how far a man allows these sensory impressions to predominate and affect his racial organs. Again, in addition to revelling in acquaintance with erotic and obscene literature, plays, pictures, etc., he may allow ideas of this type to permeate his imagination, permitting his thoughts to dwell upon them with erotic tendency. Both the mental habits so fostered tend to lead to constant sex excitement, which is, of course, exceedingly debilitating from a physical, mental, and moral point of view. Supervisors and advisers of youth should understand the relation of sensory impressions to sexual stimulation, but, in their endeavour to help youthhood towards sex control should not *suggest*. To tell a youth that the sight of the semi-nude stimulates passion, so it seems, may tend to arouse feelings which may not be awake at all, and may so bring about an unhealthy condition of mind. The difficulty should be met in this way. Suppose a youth speaks of having strong sexual feelings at times. Find out by judicious questioning when they are most troublesome, and so determine the nature of the stimulus. Point out this so that he may understand his own case and master it. The nature of other cases should not be enlarged upon at all unless the youth shows an inquiring spirit: to evade which will, of course, be harmfully provocative. But by exercising keen will-power over the direction of thoughts, and by resolutely closing the

imagination to the sensory impression of erotic subjects, and thereby rendering it immune to harmful impression, a youth may greatly fortify himself against sexual laxity and distress. He should be trained, and train himself, right from boyhood to appreciate the æsthetic purely, and should absolutely free himself from the dominion of eroticism. There is much to be said in regard to the training of girls, that they should so deport themselves and so dress themselves as to place the minimum of difficulty in the way of masculine restraint ; at the same time, the male mental attitude should be pure and cool enough to refrain from susceptibility to such slight—generally quite innocent—provocation. The more frequently he exerts his will-power to triumph, the more easily will it act for him in the day of sudden emergency, and the more easily will he find himself able to tread his path through life's experiences. Should he fail to exert self-discipline, should he yield not once, but many times, to the impulse of sensual thoughts, then the mental habit so formed will become so detrimentally strong as to overwhelm any effort of will to preserve mental and emotional serenity. Exactly the same takes place in regard to alcoholic indulgence : the first acquaintance may produce but small effect ; a weak mental nature soon finds, though, that the dominion of alcohol is difficult to overcome : the more frequent the indulgence, the more deeply the habit is established and the more difficult it is to uproot.

With girls the question of the exercise of self-control is more in the direction of cultivating restraint in conduct : that they should not weaken themselves by allowing the mind to ponder over and to luxuriate in erotic thoughts. If there is anything that puzzles them

they should seek competent advice, and disburden themselves of their difficulty. They should be led to understand quite clearly a girl's responsibility for social purity, how very greatly this depends upon the reserve of woman. In talking to girls, one has to remember that the adolescent girl may be very sensitive, and these matters, though she should understand them, must be put very gently and tactfully in order that the delicate, sensitive nature should not receive any warping blow. The ideal should be presented first, and then advice on how to climb towards it.

Before leaving this matter of self-control, the question of its relation to self-abuse should be considered. In addition to measures of physical and mental hygiene, which aid considerably towards cure, and which have already been indicated in an earlier chapter, great mental effort to advance self-mastery is necessary. It should be pointed out quite clearly that the oftener the impulse is yielded to, the more difficult will it be to obtain self-mastery. Every appeal to aid towards self-control should be made, by encouraging desire to do nothing unworthy, desire to please father and mother, desire to grow up strong and healthy, mentally and physically—and so on.

A boy who would attain his fullest powers—not only physical and mental, but social—of manhood, the girl who would blossom into magnificent womanhood, must effect absolute self-restraint. Let the boy or girl know that they have their adviser's fullest sympathy; that if they fail once, twice, or many times, they may always be assured of sympathy and re-encouragement so long as they continue to strive. Every boy and every girl more or less unconsciously looks forward to adulthood,

the day when they, in their turn, will inspire confidence and respect and may exert authority. But unless they have full confidence in themselves, unless they can trust themselves to remain firm in the face of temptation (whatever that temptation may be), they will not be in a position to inspire confidence in others. No boy or girl who has had the nature of their wrong-doing explained to them can recontinue the practice without a feeling of shame, of secrecy, and of loss of self-respect. It is here that the demoralising effects of vicious practices are so poignant.

> "Man who man would be,
> Must rule the empire of himself; in it
> Must be supreme, establishing his throne
> On vanquished will, quelling the anarchy
> Of hopes and fears, being himself alone." [1]

It will be obvious that if there be antagonism between the environmental influence of school and home life, progress towards self-discipline will be subject to fluctuation. Perfect harmony in aim will be of inestimable effect in securing that children achieve self-discipline. Regular hours of rising and sleeping, regularity in meals, plain, nutritious food, subservience of the individual in the interests of communal life, are the conditions of boarding-school experience. How soon will their effect be eradicated if the holidays are one sequence of irregularity—late hours, morn and night, rich food, pampering and spoiling, "because they are home for the holidays," and so on?

That the school may play a most important part in this aspect of moral training is undeniable. At the same time, it is inadvisable for one to do more than indicate

[1] Shelley, Sonnet, "Political Greatness."

in general lines how such training should proceed, and what its inspiration should be, for obviously, so much depends upon the personality of the teacher and upon the spirit of relationship between teacher and class: a device which may be admirable in every way and accompanied by great success, when employed by one teacher, would be unusable by another, who would probably evolve quite different, though equally effective, lines of appeal. But one may say that no boy or girl should be allowed to be a prefect unless, with the confidential relation that should exist between Principal and prefect-elect, the Principal is certain that his or her influence, in maintaining sex integrity, will be secured on right lines by his or her own behaviour and attitude towards these matters.

Of the religious appeal, I propose to say but little, not because in any way its value is to be depreciated, but because religion is so much a personal matter that any attempt to deal with it *in extenso* would be liable to offend the sensitiveness of those whose religious doctrine and ideals were different from those pervading the disquisition. One may, however, say that, to the budding sense of religion which is finding its home in the adolescent mind and soul, "to teach the mighty lesson, Self-control," the religious appeal will come with inestimable force, and it may serve as a magnificent lever to

> . . lift the great Sex Passion from the darkness and the dust,
> And enshrine it on the altar of the soul."

"Religion knows this dark world well enough," says Fœrster;[1] "but it does not throw open the gates of

[1] *Marriage and the Sex Problem*, p. 126.

Hades; it pours in purifying, harmonising, calming thoughts and forces."

The adolescent mind, however, is particularly liable to succumb to emotionalism; and later, when the emotional phase passes, is liable to react: then scepticism creeps in. Any religious appeal, therefore, should be made on thoroughly rational lines of dignified thought: sentimentalism, whether it appear in religious teaching or otherwise, is not only evanescent in effectiveness but harmful in effect.

The establishment of self-discipline is one aspect only, of ethical training in regard to sex. Let us turn now to the question of mental hygiene. Imagination, "which has been called the noblest attribute of man," has its hygienic uses, which no one who has the welfare of childhood or youth at heart can afford to neglect. The brain without imagination, as Sir James Crichton-Browne points out,[1] is like a country without roads and railroads, in which locomotion is laborious and slow. Welton says, "The whole progress of the human race has been due to its imagining of better things and its efforts to make those imaginings real."[2] The cult of the imagination is a responsible factor in mental hygiene: of great importance is its tremendous recuperative value to the jaded or narrowly-environed mentality, which seeks rapaciously for refreshment. Present-day conditions of labour, narrowing down the activities to one monotonous task as they do, increase the demand for mental recuperation: hence we find

[1] "Hygienic Uses of the Imagination," *Brit. Med. Journal*, August 1889.

[2] Quoted from Sandiford, *Physical and Mental Development of School Children*, p. 259 et seq.

the rage for picture-palaces, novel-reading, theatre-going, and such pleasures as wandering along the gas-lighted streets and in the markets can afford. For the poorer class or badly-paid workers, only cheap entertainments and means of relaxation are possible, and unfortunately these cheap entertainments are generally of a deteriorating character, or at any rate liable to create no beneficial impression. "Penny dreadfuls" form the mental relaxation of the errand-boy, and dramatised "penny dreadfuls" the gist of the "picture palace" performance. The demand for mental recuperation is instinctive and healthy, a natural reaction to monotonous employment, but we need a highly cultivated social consciousness which shall lead to the supply of uplifting or, at any rate, non-deteriorating means of enjoyment within the resources of the poor—coupled with a system of education which shall aim at creating that mental desire which shall be unsatisfied with the low type of attractions which is at present so greatly available. A quick, vivid imagination is priceless, but just in proportion to its value, is it capable of being abused and degraded. Nowhere is that more evident than in novels. Facts concerning the sad things of life, social evils, pass through the brain of a Dickens or a Scott, says Sir James Crichton-Browne, and become purified and educative: through the brain of a Zola, pernicious and infective as with deadly moral plague. The value of an ideal is inestimable; a healthily stimulated imagination places high up in the mists of the future a goal towards which we climb: be it, then, the task of the educator to help the adolescent to "hitch his wagon to a star."

There are, of course, certain possible difficulties which may present themselves to the mind. Mrs. Mumford [1] points out how children of a highly imaginative type may tend to allow dreaming of things done to take place of actual doing, and also that children with quick imaginative flight from one subject to another — probably connectedly enough in the child's conception —are liable to leave things unfinished. These are two ethical aspects of the question which must be faced by elders and circumvented, as far as possible, without in any way inhibiting the imaginative process. 'Day-dreaming' in neurotic children is another condition of imagination which should be discouraged; for, as has already been pointed out in an earlier chapter, such a habit often presages morbidity of thought. It is well to encourage constructive imagination along lines of practical accomplishment (*e.g.* devising how to build an outdoor house for animal pets, or how to arrange a garden) in children of this type, to provide plenty of scope for activity, and to discourage monotonous, easily-accomplished employment.

The right exercise of the imagination has, then, great hygienic use in maintaining a healthy mental condition and in advancing the cult of the ideal. A further aid towards mental hygiene will be to clear the mental atmosphere of fog: not to allow any foolish prejudice to obscure the real aim of ethical training. The fact of evil has to be faced: our girls and boys have to be safeguarded from social risks: security lies in knowledge and in aspiration. Professor Earl Barnes points out that in any attempt at sex education we should not ignore the fact of the pleasures of sex. It is precisely

[1] *Dawn of Character*, chap. iv.

in connection with selfish gratification of the pleasures of sex that so much ill-happening pervades society. Literature, History, Bible-reading, offer us their treasure-trove of inspiring example—heroism, strength, and nobility of character, of integrity, of unselfish devotion to a cause, of chivalry, of womanliness and of manliness. George Eliot gives us some of the best studies of adolescents, the doings and thoughts of whom are essentially comprehensible to boys and girls who have passed or who are passing through the same stage in life's journey. Boys may aspire to be like rough John de Brent, in the *Lady of the Lake*. Young Ellen, timid and shrinking, puts her fear from her and crosses the courtyard to visit her father in his dungeon. The men in the courtyard leer at her girlishness. John de Brent leaps forward in impulsive chivalry to protect her from their rudeness. There is something, too, in every manly boy that revolts at once against such conduct as young Steerforth shows towards Little Emily in *David Copperfield*, and a story like this may be made an opportunity of explaining to girls the possible sad results of yielding, in unwise generosity, to a man's solicitations. This is one of the instances of a social evil which, as Sir James Crichton-Browne says, passes through the brain of a Dickens and comes out purified and educative.

See, again, how the story of Hetty Sorrel's betrayal by Arthur Donnithorne serves to illuminate. She, in her despair, is led to murder her child, and in her turn is sentenced to suffer the death penalty. Selfish pursuit of pleasure on his part, thoughtlessness in its gratification, bring in their train a terrible grief and regret. "God knows I'd give my life if I could undo it." "There's a sort of damage that can't be made up for,"

says Adam Bede. How much may be made out of *Pendennis*! The mother prays for her boy, Arthur, "as mothers only know how to plead," when he goes to college, that he may pass through the trials of his new life without flaw. Her terrible grief comes when she learns that the boy she prayed for so earnestly has degenerated into loose ways in London.

These are just a few examples of the way in which literature [1] may help us in connection with education for life's great purpose, if only elders, teachers, or parents will be alert enough to recognise opportunities and courageous enough to take them. The experience of the headmistress of a girls' school should help others to take their courage in both hands. I quote from her letter :

"The Scripture syllabus included 2 Samuel. The girls (average age, 16 to 17) read in advance the chapters to be discussed, sometimes the whole book, before lessons are given on it. The work set for the week was chapters xi.–xiv. I was quite aware of the difficulty of chapter xiii., but knew that certainly more attention would be paid to it if I said, 'Omit chapter xiii.' In my lesson I only referred to the murder of Amnon by Absalom as a cause for the flight of Absalom. But afterwards one of the prefects—and perhaps one of the nicest girls I have ever had in the school—came to me and said, 'The girls are saying that 2 Samuel is a horrid book, and ought not to be read. I am the eldest of a large family, and know more than most of them, perhaps,

[1] The National Home Reading Union, Surrey House, Embankment, W.C., invites affiliation of Reading Circles, home, social, and school. And in this way, boys and girls may be put in touch with good, stimulating, and bright books.

but I do not feel I can speak to them about this, and I did not think you would like them to be "running down" the Bible. Will you speak to them?' So I went up to them and told them that I had heard they had difficulties about this chapter, that, of course, I was aware of its contents, and had considered what best to do; and I asked them what would have happened had I said, 'You can omit chapter xiii.' They smiled. Then I asked which of them did not understand what happened. All understood except two. So I told them very briefly what it meant. I said, 'Amnon treated his sister as if she were his wife.' Then they all understood. I then said a few words to them to the effect that in the Bible the bad deeds were recorded as well as the good; that they were no longer children, and, as the results showed, they knew the principal facts about the origin of life. Evil existed, and had to be faced—and so on. I asked them to ask their mothers for information on any point they did not understand in the connection, and told them that I thought they were old enough, and that their mothers would probably think so too, to be informed rightly about these facts.

"They were perfectly natural and simple about it. I heard from the prefect later that nothing further had been said, and that no discussion had taken place among themselves afterwards about these matters."

There is much to be said in favour of reading aloud as a method of training in self-confidence and in accomplishment. Well-chosen fiction would give many chances of informing girls and boys on social problems. They would grasp facts, and weigh considerations much more wholesomely in this way, than if they read the same passages alone, for then they tend to ponder

more or less morbidly over things they fail to understand, or which they see in wrong proportion.

Nor is one confined to novel-fiction for choice. The poem may in some measure repay the indebtedness of the poet to the Great Giver of Genius when it raises a soul to a higher plane of conduct, or illumines a life with a spark of the ideal, or causes one heart-throb of desire for the perfect in thought and deed. A thought-garden illimitable to explore, manifold and various in its yield of seed. But manifold and various also are the growing-grounds, some stony, some rich, some receptive, some exclusive—each thought may find one home in which to rest, to root, and grow. The gentle and simple exaltation of the love-theme running through "An English Madonna"[1] may find a root-hold where the magnificent portrayal of an ideal of love-relationship in *Paradise Lost* may fail to implant itself; the lesson of chivalry and nobility in the "Idylls of the King," the quiet endurance and heroism of motherhood in "Cain,"[2] will find a joyous reception in many minds. Milton's "Comus" shows how man's lower nature will struggle to assert itself. Many of the simple poems for children even carry a little message of beauty, and may stir the first gentle promptings towards the ideal. The thoughts may be uplifted, the desires hallowed, effort directed towards fulfilment of high aim; a few lines, pregnant with inspirative power, may fasten themselves in the memory, there to abide ever ready to inspire and to colour the whole life-theme.

Enlightening ignorance, clearing the mental atmo-

[1] James Hinton; see also *Love's Offering*, poems by the same poet.

[2] *Songs of Dreams*, by Ethel Clifford.

sphere of fog, inculcating an ideal of love and marriage, presenting the facts of sex in a true and reverent light, we shall proceed far towards cultivating an attitude of mind which shall find loose conversation or pornographic literature repulsive, not attractive—yet another aim in mental hygiene.

Mr. C. B. Andrews, in his book, *Adolescent Education*, draws attention to the value of the swimming-bath as an aid towards moral education, for the daily swim not only provides a wholesome outlet for mental energy, and makes for the attainment of self-confidence, but, carried out under conditions which admit of no development of false modesty, is excellent in its moral influence.

There are still other important aspects of ethical training to consider; for, ideally, we would wish that adolescents, understanding sex in itself and in relation to society, not only learn to understand themselves and to control their passions, but that their conduct should be moulded consciously by their own aspiration, and unconsciously by the positive, directive force of their mental and spiritual environment, towards the highest possibilities of sex. For it is quite possible, of course, to understand sex and sex matters, to recognise and circumvent critical situations, to be strong enough to resist any temptation that one did not wish to accept, and yet to fall considerably short of the ideal. And, though in successful sex education, we may feel glad to have secured that boys and girls are so equipped with knowledge and so developed in will-power that they will lead chaste lives, secured from social risks, we must recognise that our sex education will be worthier the name if it succeeds in inculcating a reserve, borne of a high ideal of the love-relationship and of the out-

come of the love-relationship—parenthood. Let the girl know within herself that she could yield to the caresses and the love of no man but him whose spirit will leap out to meet hers, and whose ideal is of the same intrinsic purity as her own. Let the boy know within himself that motherhood is the greatest honour to which a woman may attain, and that marriage means something more than passion, that love, comradeship, intellectual and spiritual sympathy all form the bond which unite man and woman in the happiest lifelong union; and knowing these things, let him build up for himself, in all humility, an ideal of what he, himself, should be, in order that he should be fit to offer himself to her whose ideal is attuned to vibrate in harmony with his own. Let him so realise what maternity means to a woman that when the inevitable conflict between the two purposive factors in marriage arrives, he will be ready to sacrifice the self-gratifying on the altar of the altruistic.[1]

The path of progress is rarely easy; by difficult steps and slow has man climbed the evolutionary tree, and with his evolved gifts of reason and of choice, he may climb still higher, though the difficulty is by no means lessened. Monogamous marriage of lifelong duration is the highest form of union; the very discipline it involves, both in its highest preparation, pre-marital chastity, and in its well-regulated pursuance, exerts a psychological influence which makes for the uplift of mankind—and,

[1] This is a greatly important point in connection with the training of youths. Many married men pride themselves on their chastity, but in their selfishness and misunderstanding obtain the price of the chastity in absolute inconsideration of their wives. Marriage calls for restraint and mutual regard.

though numerically it tends to restrict the increase of the race, qualitatively it is a great asset in racial betterment, for the provision it makes, through communion of body and spirit, through constant action and reaction of two psyches one upon the other, bearing one another's burdens and sharing joys, through the constant self-expression it allows in a sympathetic atmosphere—through all these conditions it tends to bring men and women to the perfect happiness, and so to fit them better for the consummation of love—parenthood. And because it involves such great responsibility, because in its supremest essence it presents the highest possibility of happiness and fulfilment of purpose, it should not be rushed into thoughtlessly nor irresponsibly, and within the bond, the egoistic joys of sex should subserve, and not endanger the altruistic joys of parenthood. "No part of the art of living is more important for youth than developing in one's self the knowledge of a predestined fellowship which permits of waiting. People curse the hazards which separate lovers. But it is less the hazards which separate than those which unite at the wrong time, that ought to be cursed." [1]

Stimulated into life by the light of the ideal—the ideal of marriage and reverence for maternity—self-respect and other-sex respect will blossom forth, and from the blossom will come the fruit—sex integrity—and each will be content to wait.

"Somewhere there waited, in this world of ours,
For one lone soul, another lonely soul,
Each chasing each through all the weary hours,
And meeting strangely at one sudden goal,
Then blend they, like green leaves with golden flowers,
Into one beautiful and perfect whole." [2]

[1] Ellen Key, *Love and Marriage.* [2] Edwin Arnold.

The question of ethical training presents many difficulties : some children and adolescents are much more responsive than others ; some, whom we would help, are at the mercy of a wholly antagonistic environment ; some are perhaps so much immersed in unhealthy social conditions that help seems well-nigh impossible. Witness the difficulty which faced a teacher in an elementary school, a teacher whose whole desire was to help her girls forward. On inquiring from a girl as to the reason for her absence from school during the preceding week, she received the reply, " Please, miss, mother had a baby and I had to help at home." And the teacher knew that the girl's father had died two years previously, and that the mother was not married again ! Or take again the case of children whose parents are divorced : how far can such children realise an ideal of marriage when their own parents have failed to make anything of it save a wreck ?

The fact of evil has to be faced : we must not evade it. The same difficulties confront him who would instil the doctrine of temperance into the minds of children whose parents are habitually drunken. To raise up an ideal, in such case, seems either impossible or, if successful, to bring in its train, disrespect of parents. It is in meeting such difficulties as these that the whole ingenuity and resource of the teacher is called into action, to show what the ideal may be, but that many people have never had the advantage of having the ideal raised before them, and are to be pitied in their misfortune when calamity overtakes them and they fall to low grades of conduct—and, again, that many may fail to achieve where others succeed. Some men are honest because they have had no temptation to steal : they

are to be congratulated on their freedom from temptation. Some men are honest because they have striven against and vanquished the foe, temptation: they are to be admired and respected. Some men are dishonest because temptation has been too strong for them in their special circumstances or in their weakness of will to overcome: these are to be pitied, and not reviled. Evil-doing brings its inevitable recompense, and that is punishment enough. So, perhaps, he who would teach and inspire, with warm-hearted insight and resourcefulness will be able to weave into his teaching an exalted idea of the possible, and a broad-mindedness which shall understand, without embitterment, the failure.

CHAPTER IX

Education for Parenthood

When we have done our utmost in the way of instructing youthhood in normal sex phenomena, and our utmost to safeguard youth from the pitfalls and risks of social life, and when we have sought diligently to lead the youthful idea into pursuit of the ideal and noble in conduct, there still remains a field of labour for us—and that the ultimate goal of sex education—education for parenthood. It is not for parents or for teachers to say which boys and girls shall ultimately enter into the privilege of marriage and parenthood—that, in time, each shall decide for himself. But it is for parents and teachers, and all of those who may be in any way responsible for the care of youth, to realise that each boy and each girl is a potential parent, that each may be called into the joy and responsibility of parenthood, and that therefore each is entitled to some instruction and guidance in regard to their highest possible responsibilities.

Man cannot regard himself in isolation; he bears a relation to society, and therefore has a duty towards society; he is responsible for the race, and therefore has a duty towards the race. His conception of personal conduct and ideal will, therefore, be incomplete, and, moreover, unworthy, if it fails to recognise his obligations to society and towards the race. Sex may be considered

a personal matter, but it subserves rèproduction, which is a social affair.

Education for parenthood is by no means the difficult task it may have seemed to be some years ago, for biologic and medical science has made great strides during the last fourteen years, and has placed before us many facts and many possibilities which may give us a basis for education for parenthood. The rediscovery at the end of the nineteenth century of Mendel's work on hybridisation opened up a whole new field of research in heredity, and we owe a debt of gratitude to the geneticists, not only for the information they are gradually finding themselves able to place before the public, in regard to the transmissibility of traits, but for enlightening a wilderness of shade and showing us in some degree the right paths to take, but, up to the present, in greater degree, the paths to avoid. Every organism comes under the dominion and influence of three factors: Heredity, by which it is endowed with its gifts—good, bad, indifferent—from its bears and forbears; Environment, which may foster, encourage, or inhibit the development of gifts heredity bestows; Function (which by Professor J. Arthur Thomson is regarded as a separate influential factor, though by some authorities as part of the environmental factor), by which many of the gifts may be intensified in expressiveness or diminished in power, even to a negligible residuum. According to the way in which a particular group of organisms reacts under these three factors, so the type of the group tends towards betterment or impairment.

Man, we believe, has attained his position in the organic world by a process of evolution, by a gradual accumulation and perpetuation of traits which have fitted him best to meet the exigencies of his environ-

ment. We believe, too, that evolution is still in progress, and we hope that our descendants will be better in every way than we ourselves. In the plane of mental life it is that man has far outstripped the animals. With his evolved power of reasoning, with his capacity for exercising intelligent choice, he may do much to quicken the speed of man's evolution. And to do this, he must study the factors under which his present position has been obtained, and under which progress may still be made towards racial betterment.

Eugenics is a science which has for its object "the study of agencies under social control which may improve or impair the racial qualities of future generations, either physically or mentally," and out of the knowledge that this study gives us, out of the hope which evolution itself bids us have, emerges the eugenic ideal—an ideal of parenthood and race culture, an ideal which strengthens our hope and desire that men and women may be nobler and finer—free from physical and mental weakness, free from the taint of wrong-doing and from the dominion of vice.

The first step towards the approach of the ideal is to find out the nature of the forces keeping us away from it. What, at present, is keeping us back? And having discovered something of this, what may we do to go forward? These are the questions the eugenists are attempting to answer—and in answering them, to determine how far we may proceed on constructive lines to help on the progress of the race, and how far we may proceed on preventive lines. The characters and attributes of every individual are due to the three factors: those which he inherited from his parents, grandparents, and even earlier progenitors—this is

spoken of as 'nature'; those which are due to his reaction to environment and to function—these two comprise 'nurture,' which includes every influence—physical, mental, social, spiritual—under which the organism comes from the moment of conception. The sperm and the egg bring with them the inherited attributes; they fuse. A new life begins, and thereafter is under the influence of nurture.

Mendel's work, and the work of those who are following after Mendel, makes quite clear to us that certain parental characters are transmitted to their offspring, that many of these characters may be wholly or partially obscured in evidence, but that they remain latent but potential, that they may be transmitted for several generations still latent but potential—and that when of two parents, both contain this recessive factor in a latent condition, there is every likelihood of its appearing in the active form in some of their children.

Another great truth that we have learnt from Mendel's and subsequent work is that by a new combination of factors it is possible to obtain new types.

Human nature and human characteristics are, however, of such great complexity—each trait may be due to the presence or absence of not one, but many factors—that definite knowledge which may help us towards the upbuilding of the human type is very slow and difficult to obtain. Then, also, human nature does not lend itself to experiment—we must, for the main, rely upon investigation of pedigrees and family histories in order to find out which traits are transmitted from one generation to another, and which of them tend to be obscured for one or more generations, and ultimately to crop up. Naturally most of the information which we have at the

present time relates to conspicuous characters which are for the most part abnormalities—albinism, certain eye diseases, certain forms of mental deficiency seem to be transmitted in Mendelian ratio, a certain form of deaf-mutism, colour-blindness, and so on. Some of these, *e.g.* colour-blindness, seem to be submitted to a curious hereditary route : the male members of a family afflicted with this abnormality show the condition, but it is transmitted only by their daughters, who are themselves apparently normal, but evidently possess the factor for colour-blindness recessively, for they in turn transmit it to their sons, who are colour-blind. Briefly, the sons of colour-blind men are normal, the daughters of colour-blind men are apparently normal, but may have colour-blind sons.

Eye-colour seems to be transmitted according to laws of Mendelian inheritance—' blueness ' being recessive to ' brownness,' that is, two parents of pure blue-eyed type will only have blue-eyed children, but if one of the parents be brown-eyed and the other blue, the eye-colour of the children will vary, according to the particular type of ' brownness ' (brown eye-colour is a complex condition) which constitutes the eye-colour of the brown-eyed parent. Major Hurst is of the opinion, based upon his researches, that the musical sense passes from one generation to another as a Mendelian recessive, and there seems certain indication that skin colour, powers of work and invention, possible duration of life, liability to certain diseases, and some others of the many features by which people differ from one another are determined at the moment of conception—that is to say, are definitely hereditary factors.

However, up to the present, we have insufficient

knowledge of the genetics of human characteristics to justify us in any attempt to improve the race by organised marriage, even if social opinion would allow it. Most of the knowledge we have relates to the inheritance of weaknesses or abnormalities. This knowledge is invaluable, for it shows us how we may aid in the regeneration of the race by avoiding the production of weakened or degenerate types.

The feeble-minded are a most important part of the problem. Not only is feeble-mindedness one of those traits which pass from one generation to another, but feeble-minded people tend to marry among themselves, and, through the natural extravagance and uncontrolledness of their disposition have, as a rule, very large families.

Feeble-mindedness is so inextricably interwoven with conditions of vagrancy, destitution, criminality, inebriety, and other forms of degeneration that its extensiveness and perpetuity tend to be an extreme racial peril. Professor Karl Pearson has shown that the average number of offspring among the degenerates of London is 7. Dr. Tredgold has called attention to an observation on similar lines; he found among 43 couples of the unthrifty—'parasitic'—working class an average of 7·4 per family, while among 91 families of the thrifty working-class type the average was 3·7 per family, *i.e.* exactly half of the number in the 'parasitic' working-class family. Sidney Webb has found that the number of children born to the intellectual section of the community works out at 1·5 per head. These results, together with those of other investigators, go to show that, although at the present time the degenerates are in the minority of the popula-

tion, their rate of increase as compared with that of the normal part of the population is a serious menace to racial security. In fact, Mr. Whetham has calculated that under present conditions and rate of increase, in three generations every 1000 members of the skilled worker and intellectual section of the community will be represented by 687 descendants, while every 1000 members of the degenerate and feeble-minded type will be represented by 3600 descendants. Happily, in England, the Mental Deficiency Act of 1913 now provides for the care and detention in institutions of some of these feeble-minded persons, so that the future of the race will be in some proportion safeguarded.

With regard to the appearance of feeble-mindedness in an individual, heredity and environment both play a part in causation, though heredity is apparently the greater factor. Some forms of mental deficiency act as Mendelian recessives: hence the children of a mentally defective and a normal person may be all apparently normal, but capable of transmitting their mental defect; and two apparently normal parents ('impure dominants') of a mentally defective stock may have some mental defectives among their children. The children of two mentally defective people, provided the mental deficiency is of *the same type in each parent*, are always defective. Then, again, there seems to be a very definite relation between epilepsy and feeble-mindedness—the children of the epileptic often evidencing feeble-mindedness, and *vice versa*. And, again, the children of the syphilitic parent and of the inebriate parent are frequently tainted with the parental weakness manifesting itself in another form—mental deficiency. Some forms of epilepsy are due to irritation of the brain

surface, or some similar condition; these are regarded as 'acquired,' and are not heritable, but other forms are of genetic origin, and are apparently inherited according to the Mendelian law.

The problems of insanity and of tuberculosis always interest the inquirer into human heredity, and at the present stage of knowledge and information available, it seems that only the most cautious statement upon either is possible. With regard to insanity, its causation may be very complex, so that no single pronouncement upon its heritableness may be justly made. What may be inherited in certain types is a *tendency* towards insanity, the development of the condition being entirely due to environmental encouragement. In the case of tuberculosis, the tubercle bacillus, though it may be present in the mother, only with the greatest rarity finds its way through the placenta [1]—so that we may say tuberculosis is not transmissible.[2] But here, again, a liability to succumb to infection is thought to be inherited: hence the children of tuberculous parents should be removed from possibility of infection, and be fortified against their susceptibility in every way by careful, protective supervision.[3]

Before turning our thoughts to any practical policy of education for parenthood, we must faithfully consider other aspects of the question of national culture, many of which are, to say the least, closely allied to the more definitely eugenic problems.

[1] Professor von Pirquet of Vienna emphasises the fact that prenatal infection is very rare; all such cases in his experience die (Royal Institute of Public Health Congress, July 1914).

[2] See forward, p. 202 seq., for tuberculosis as a factor in racial deterioration.

[3] See footnote to p. 201.

We know that incompetent motherhood is largely responsible for the high death-rate of children : maternity in the human race does not of itself, although it may serve to awaken certain instinctive efforts, bring with it knowledge of the needs and care of infant life. Many mothers-to-be are absolutely ignorant of the fact that a mother may influence her unborn babe, and that the care of the baby should begin nine months before the baby comes out into the world. More than that, great ignorance prevails in regard to what Dr. Saleeby calls the ' racial poisons,' against the influence of which the race should be protected.

The foremost of these is alcohol. From the social point of view alone, knowing as we do of the incalculable distress, poverty, lapses in conduct, suffering in body and in mind which inebriety brings in its train, we have every reason to advocate education in habits of moderation, and from the racial point of view the appeal is doubly reinforced. In two special ways may alcohol be regarded as a racial poison. First, it may actually damage the germ-cells [1] themselves, so that such germ-cells will lose much of their vital power, and will develop into weakly children with little power of resistance to disease and strain. Dr. Mjöen [2] concludes that the hurtfulness of chronic alcoholism upon the sexual glands is not to be denied, and that the stronger the alcohol customarily taken, the greater the injurious effect. Second, the lowered vitality of the offspring of alcoholic parents is still further lowered, after birth ; for the mother often, through her own or her parents' alcoholism, seems to become deficient in the power of

[1] Saleeby, *Progress of Eugenics*, p. 231.
[2] *Problems of Eugenics*, vol. ii. p. 177.

producing milk; and if she is able to supply milk for her baby, and at the same time takes alcohol in her diet, the presence of alcohol in the milk is evident soon after the dose. In addition to this, alcohol is one of the very few things which can make its way through the placenta, so that an inebriate mother not only feeds her baby with alcohol-tainted milk after birth,[1] but before birth its stream of nourishment (the mother's blood-stream) is tainted. So that it is not surprising to find that there is a high death-rate among children of inebriate parents during the early years of life.

The brunt of the strain caused by such malnutrition falls upon the nervous system, hence the children of alcoholic parentage frequently show signs of dullness and moral instability, and if there is any latent strain of mental or physical deficiency,[2] it is likely to make its appearance in active form. Alcoholism may thus, in some cases, be the cause of mental weakness breaking out, or in other cases the yielding to and the intensity of the craving may be the result of mental flaw.

Consider, too, the less direct ways in which alcoholism may exercise a deleterious effect upon the race. The money that is spent on alcohol is frequently obtained

[1] Mothers frequently take stout and other alcoholic beverages during the period of nursing under the impression that it increases the milk supply. It does sometimes increase the bulk, but diminishes the nutrient qualities of the milk (Saleeby, *Woman and Womanhood*, p. 370 et seq.).

[2] Dr. Mjöen gives an account of observations made in Norway. During the period 1816–1835 brandy was untaxed; the proportion of feeble-minded increased over 100 per cent. When taxation compelled the bulk of the people to return to cheap beer, this proportion was greatly reduced. Dr. Mjoen says, "The enormous increase of idiots came and went with the brandy" (*Problems of Eugenics*, vol. ii. p. 179).

at the expense of the children's food and clothes; inebriate parents usually neglect their children and their homes; and the irresponsible conduct of inebriate parents is frequently the cause of much suffering and even death by misadventure for the children, as the Society for the Prevention of Cruelty to Children can affirm.

Add to these facts the knowledge that drink plays so great a part in the problem of crime, prostitution, and immorality, that our national drink bill is estimated at £160,000,000 a year, that the annual expenditure in the United Kingdom on poor relief, the upkeep of lunatic asylums, police, law administration, is about £48,000,000,[1] that much of this money could, if released from this direction, be diverted into streams greatly beneficial to the nation—education, relief of taxation, care of expectant motherhood, alleviation of social conditions, and so forth. There is every reason, therefore, for some great effort at national training towards moderation and temperance reform, the solution of which problem lies not only in education but in the stimulation of a national consciousness to tackle problems of social reform, of economics, and of housing. Many a man goes to the public-house because it is more cheerful than his home, and many a woman is driven to seek fictitious joy and exhilaration in alcohol as respite from a monotonous, poverty-stricken, work-wearied existence.

Alcohol is the most widely diffused 'racial poison'; others, of a more restricted sphere of influence, are concerned chiefly with trades. Of these, lead-poisoning has a strongly detrimental effect upon the health of

[1] Major L. Darwin, "The Cost of Degeneracy," *Eugenics Review*, vol. v. No. 2.

the workers, and further than that, greatly damages their procreative power. So great is the harm done to the expectant mother and her child, and so peculiarly susceptible to lead-poisoning are women, that they are now excluded from the white lead trade. Lead is widely used in the process of glazing pottery, but it is possible to get a 'leadless' glaze which is just as effective and does not involve the risk to the workers and their unborn children. Sir Thomas Oliver is of the opinion, based upon his valuable researches, that lead destroys the racial powers of both men and women, and that its effect upon women during expectant motherhood is responsible for great destruction of human life.[1] All during the months of expectant motherhood while a woman is working in a trade in which lead in some form or another is freely handled and used in large quantities, lead is circulating in the maternal blood-stream, injuring and poisoning the tissues of the developing child. Hence an extremely high rate of infant mortality, still-births, and miscarriages is to be found in families whose parents are employed in lead industries. Other dangerous trades play great havoc with the health of the individual. The manufacture of arsenic, of rubber, the use of mercury in certain trades, each involves great risk to the health of the workers; but it is in the lead trades that the danger to the offspring of the workers is greatest.

To turn again to the question of tuberculosis, although the tubercle bacillus itself is not held to be transmitted, there is undoubtedly a tendency for tuberculosis to 'run in families,' as we say—and this may be ascribed to three main causes: (1) that a tubercular subject

[1] See *Diseases of Occupation*, by Sir Thomas Oliver.

passes through a stage in the disease in which they are infective to others; (2) that many environmental conditions, *e.g.* overcrowding, lack of sunlight, improper and insufficient feeding, alcoholism, influenza, lack of fresh air, tend to lower the resistance against infection; (3) that the prenatal conditions of the child of a tubercular mother may be such as to cause its later resistance to infection to be lowered. It is probable, too, that the germ-cell tissue of a tubercular person may be weakened, so that the offspring are likely to begin life handicapped; and, as already pointed out, the liability to succumb to infection may be inherited. Such children, exposed to the super-average infection which will obtain in a household which includes an inmate in an infectious condition, especially if their resistance is further lowered by detrimental nurtural conditions, are very likely to fall victims to the disease. Even in non-tubercular families, unhealthy environmental conditions are likely to lower resistance to disease, and such children or adults may acquire susceptibility. In regard to the feeding of children, at the Congress of the Royal Institute of Public Health, July 1914, Professor Delépine, Professor von Pirquet, and many other medical authorities emphasised the fact that abdominal tuberculosis in children is greatly due to infection through bad milk.

It seems, therefore, that in the light of present knowledge, the campaign against tuberculosis as a racial scourge can be greatly aided through social education; for the *prevention* of tuberculosis lies largely with the people themselves.[1]

[1] See *Health and Disease*, by W. L. Mackenzie, published by Williams & Norgate, for an able and simple discussion of the tuberculosis problem.

The same principle applies to other infectious diseases which are greatly harmful to the race, and the *prevention* of which is largely a task for the people themselves to fulfil. The two most prevalent of these infectious 'social diseases' are gonococcus infection and syphilis. The 'social diseases,' as Dr. Helen Putnam calls them, include tuberculosis, syphilis, gonococcus infection, typhus (now practically extinct in our country, thanks to improvement in social conditions), the spread of all of which is largely due to our social practices. Gonococcus infection in its commonest form, gonorrhœa, is exceedingly prevalent, more so than syphilis; the two together, though, are much more prevalent than tuberculosis.[1] So widespreading are they, and so harmful may their results be, particularly if they are not treated in the earliest stages, to the individual infected, and frequently to the children they may bear, that a Royal Commission to inquire into the means of preventing the spread of these diseases has been appointed, and is now conducting its inquiry.

Gonorrhœa is an infected condition of the racial organs, and if the infection is not prevented from spreading, it may, particularly in women, make its way to adjacent organs of the body, causing severe complaints often necessitating very serious operations. A large proportion of the diseases to which women are particularly liable are due to gonococcus infection. In addition to this, the racial organs themselves are

[1] For an estimate of the prevalence of venereal disease see Dr. Douglas White's evidence before the Royal Commission (Appendix to the First Report, Question 10,072 et seq.). Also *The Problem of Nations*, by A. Corbett-Smith, published by John Bale, Sons, & Daniellson. Also R. W. Johnstone's Government Report on *Venereal Diseases*.

frequently deprived of their generative power, so that the man or woman so diseased is incapable of having children; in fact, this is one of the causes of childless marriages, or sometimes it may be that there is one child only to the marriage, and no more.

Should a little girl become infected, the harm done to her is frequently very serious; the racial organs are very likely to be irretrievably damaged. In some cases inflammatory conditions of the joints arise, which may lead to permanent crippling, this, however, being more frequent in men, generally about three weeks after infection.

Should the infection be transferred to the eyes, disease and even blindness very frequently results. A large percentage of cases of infantile blindness are due to infection of the baby's eyes by this disease.[1] Now, however, one of the first services to be performed for a newly-born baby is that its eyes must be bathed with disinfectant solution, to prevent the calamity of blindness.

Syphilis, the other of the two infectious diseases which play so great a part in the suffering of humanity, though less prevalent than gonococcus infection (yet still very prevalent), is more far-reaching in its effects. For, in a few weeks, if not prevented by treatment, the infection makes its way from the point of inoculation into the blood-stream, and is so carried round the body, revealing itself generally in characteristic skin eruptions and mucous patches in the throat and elsewhere, which are the visible signs of general infection; the disease may finally fix itself in any part of the body or nervous system.

[1] According to evidence given before the Royal Commission, about half of all cases of children's blindness is due to gonococcus infection and about half of the remainder of cases to syphilis.

It is during this period, which varies greatly in length of duration (if untreated, from two to five years, or even more), that the disease is most easily communicated from one person to another, either directly by contact (as in sexual intercourse or even by a kiss) or indirectly by drinking-vessels, towels, table utensils, pipes, etc., which may have been used by a syphilitic person. After this period of infectivity, the disease, if not yet properly treated, passes into a stage which, though non-infective, still produces further serious effects on the patient himself—no single organ of the body seems to be free from the possibility of attack; the nervous system is specially liable to damage at this period; syphilis, indeed, is now definitely recognised as the cause of general paralysis of the insane,[1] and locomotor ataxy, as well as most cases of aneurysm.

The seriousness of syphilis as a racial scourge, great as it is, does not, however, stop short at the individual infected. It seriously impairs his or her chance of having a healthy family. The children of a syphilitic parent may die before birth. Many of them, if they do live beyond early childhood, are weakly, liable to fall an easy prey to disease; certain bodily malformations and mental weaknesses may become evident, certain forms of deafness may develop, especially about the age of puberty.[2] If such children live to become parents, they may even in some cases transmit their disease, though this transmission to the third generation is very rare.

This is just a very short outline of the 'social diseases.' Of the dangers attendant upon the spread of tubercu-

[1] *Proceedings of Royal Society of Medicine*, July 1912.
[2] Still, *Diseases of Childhood.*

losis the people are coming to be aware (thanks to the propaganda work done as a result of the findings of Government and medical inquiries), and no doubt when the findings of the Royal Commission are published, an effective campaign against the other two social diseases will be inaugurated. In the meantime, the knowledge we have at hand is sufficient to show us the very great need for general information making its way abroad among the people, that they may know how these diseases are spread, and that they may realise how they may be combated, for the successful preventive campaign lies with the people themselves.

One is bound to recognise that the great agent for the spread of gonorrhœa and syphilis is prostitution; at the same time, one must also realise that the infection is frequently passed on to innocent persons, chiefly women, who may thus be involved in suffering themselves, and may ignorantly pass the infection to others. The syphilis germ may find its way into the body through any cut, or abrasion, however slight, or even through the skin glands themselves [1]; since the mouth and throat are frequently affected, kissing may be a means of transmission of the disease from one person to another, as may also drinking-vessels, pipes, barbers' utensils, etc., which have been used by a syphilitic person in an infectious condition.

Hence it is most important that our young people should be safeguarded against social risks in this way; that they should form such habits of reserve as shall protect them, and that they should develop such a conception of their personal responsibility that they will not willingly expose themselves to infection at all,

[1] Marshall. *Syphilology and Venereal Diseases.*

and that if they should be so unfortunate as to contract disease they should regard it as a deep obligation to seek immediate treatment from qualified medical source, not from chemists or quacks, for under proper medical treatment both diseases may be cured with comparative ease if taken in the earliest stages.

The question of how and when adolescents should be informed on these matters will be dealt with in a later chapter. For our present consideration, it is enough to point out that an ideal of parenthood includes the obligation to maintain health in every possible way.

The doctrine of heredity may at first seem to be discouragingly fatalistic, holding, as it does, that unit characters persist for generation after generation. But there is another aspect of the case, and that is the environmental influence. Ordinary natural inheritance requires appropriate nurture for its development, that is, the organism must be subjected to the right stimuli —stimuli of environing circumstance and of function. This nurtural factor we have under control. We are accustomed to associate a certain type of person with a certain type of dwelling-ground; but the type of person and of environment may be at once mutually reactive. The conditions of slum life help to produce the slum-dweller; and the type of person who becomes a permanent dweller in the slums, making no attempt to extricate himself, is the type that helps to produce the slums.

Many are the social experiments which have demonstrated how children and even adults, removed from their discouraging and deteriorating environment, have turned out to be satisfactory citizens. One has only to think of the work done by Dr. Barnardo's Homes, by

Dr. Graham of Kalimpong, and so on. In India, the deterioration of those people coming from a mixed British and Asiatic stock, officially[1] now known as 'Anglo-Indians,' though formerly, and still generally, as Eurasians, is a great problem in administration of Indian affairs. Their numbers are rapidly increasing, and they soon come to be of a degenerate nature. Dr. Graham, of the St. Andrew's Colonial Homes, Kalimpong, India, took Eurasian children from the depths of the slums in Indian cities and native bazaars and brought them up in an entirely new environment in the Himalayan Mountains; a new environment in every sense, physical, mental, and moral. After fourteen years he states that environment has triumphed; that these Eurasian lads and girls have grown up into men and women trustworthy, truthful, clean, reliable, and useful. Employers nearly always speak well of them, and having had one in employ, ask for more. One is bound to feel that if these youths and girls marry women and men equally emancipated from degradation, and if succeeding generations are in this way nurtured under a salutary environment, the effect of generations of bad environment may be obliterated. Dr. Graham holds that these children have good hereditary possibilities, but that these have been prevented from developing by lack of appropriate environment. In his experiment he has provided the salutary environment, with results that wholly justify his theory. Here lies the immense importance of environment; that under the wisely directed social control of man, it may be regulated and organised to encourage and strengthen the development of good traits, to limit and inhibit the development of bad

[1] Since 1911.

traits; it may possibly supply a stimulus which may tend to help variational occurrences (*i.e.* new characters springing into existence) to arise. We recognise, of course, that certain traits are free from the domination of the environmental factor, *e.g.* no change in environment is likely to obliterate the hereditary factor of albinism or of hæmophilia. But in regard to many inherited tendencies of a physical or moral nature, the importance of the nurtural factor is very great. A youth with a tendency towards tuberculosis becomes strong and resistant in a salubrious climate; a youth with a liability to succumb to alcoholic intoxication, or who comes from a crime-burdened stock, is strengthened in his resistance when placed in a fortifying, physical and moral, environment.

No judicious improvement in environment can ever do any harm, nor can we gainsay the value of a desire for better things, a desire which is only slowly accumulated by tradition and experience, and which is certain to bring in its train some of the better things thus desired. Let this inspire our education for parenthood.

CHAPTER X

Education for Parenthood—Some Suggestions

To turn our thoughts now to some suggestions for a practical policy. A practical policy may be in time, more or less widely adopted, but one cannot at present do more than suggest what it may comprise, and suggest to whom its pursuit should fall. The thoughtful parents, wishing the best for their children, will seek to place them under the rightly beneficial home, educational, and social influence ; the less thoughtful or less fortunate parents may be dependent upon the schools, the churches, the social and legislative organisations, for an impulse towards right training of their children, or even, in the interests of the nation, should have their efforts enforced and supplemented by these authorities with, of course, the minimum possible weakening of parental responsibility.

A great deal may be done through school-work, and continuation classes in the case of elementary school children ; in the secondary and public schools, girls and boys continue to attend school till they are seventeen or eighteen years of age, when much valuable influence may infiltrate their school life. However, the bulk of the nation's children leave school at the age of fourteen, and for them the problem of the continuation school

is greatly urgent, in relation to some aspects of this question of education for parenthood.

Let us consider first the question of the parental instinct. Human nature is a bundle of instincts, each of which is associated with a definite emotional condition. These instincts are innate, deep-seated, and not peculiar to man alone. The birds know how to care for and train their nestlings; the tigress can see her little ones safely through the days of babyhood; she needs no teaching: nor does the cat need ought but her true instinct to lead her to feed her kittens and to train them in the art of self-defence. Man has a long infancy; hence is in great need of parental care. His powers are higher, more elaborate, more intricate in correlation than those of the animals, more difficult of establishment in stability; hence, again, the great need for parental care. In man, subjected as he has been and is, to the incoming domination of reason, the instincts are less defined and less clearly directive. With the parental instinct in the human race, this is so. The human mother needs educating in the duties of motherhood, and in the human father this instinct stands in need of reinforcement, for it is less powerful in man than in woman.

There are adults who seem to have little of the parental instinct developed, or in whom it has gone astray, lavishing its expression over creatures that matter little. But the great majority are not so meagrely equipped with Nature's bounties. They love children; they care for children and guard them. In the human race, the parental instinct leads to more than protection, feeding, and training; it is linked on to the tender emotion, and we love children.

The racial instinct leads to children being brought into the world, the parental instinct directs for their nurture. The parental instinct may exist without the racial instinct itself being very strong : there are women, for example, who care for children and love them, but have no desire for marriage ; there are women, married and unmarried, and men, too, who devote their lives to the care of other lives ; witness the nurses and matrons in hospitals, the workers in the Salvation Army, teachers, social workers, and so on, people who may or may not have children of their own, but who have a strongly expressive parental instinct which leads them to take up and fulfil such work joyously.

We have dealt fully in the foregoing chapters with the history and nurture of the racial instinct. Everything that goes to uplift, fortify, purify, and maintain the racial instinct will enhance the object of that instinct —parenthood. But we need more than that—the parental instinct itself must be kept alive, fostered, and carefully nurtured. We see its beginnings in childhood, when the little girl plays ' little mother ' to her dolls, or flutters round the new baby caressingly ; when the little boy looks after his rabbits and pet rats in his more brusque and less demonstrative fashion. Some children possess the buddings of this instinct more strongly than others do, just as adults vary in regard to their instinctive sympathies.

It is probable that intensity of parental instinct may be inborn ; that the children of those parents who naturally expend great love and care over their children will be likely to possess a well-developed instinct.

But it is more than probable that this instinct may be weakened and suppressed as the children grow up.

A boy naturally goes through a stage in life when he suppresses sternly anything that looks like a show of feeling, and it is possible that—particularly if through lack of wise tuition, his knowledge of the racial instinct is of a degraded nature—the parental instinct, already not very intense, may not survive this period of suppression, or may only gather its surviving fragments together very slowly and in weak formation.

Girls, too, during the early years of adolescence are frequently intensely sensitive, and very susceptible to impression, and I am confident that great harm is frequently done to the girl's nature by chance thoughtless remarks of adults, remarks that are not meant seriously, but that leave their impress, though they themselves are forgotten, upon the sensitive, emotional nature of the young girl. "Never get married, Molly; babies are a perfect nuisance!" cries the busy mother. "I'd rather have golf than a baby any day!" says the young wife quite openly. Who is to know that a heart-break is hidden under the callous words? And, again, when the phenomena of puberty make their appearance, instead of parents wisely leading the boy or girl to a right view of these changes, and incidentally fostering the parental and racial instincts, so often they make the mistake of depreciating and disparaging their significance.

The boy and girl, then, should be exposed to no influence which will be liable to discourage the parental instinct or to extinguish a light that is flickering. One of the risks of modern higher education of girls is that there may be a tendency to ignore the goal of womanhood, or even to displace motherhood from its throne. The supreme privilege of mankind is parenthood—mother-

hood and fatherhood. The ideal should never be lost or submerged. In its pursuit it may involve sacrifice : to encourage selflessness, hence, will be one means of encouraging the parental instinct towards full fruition.

To consider now some other ways in which education for parenthood may be carried out, we must realise that many agencies may be brought into collaboration, that the eugenic ideal is our aim, and that there are many lights which lead towards it.

Let us open the eyes of boys and girls to the heritableness of traits, to the fact that this generation is responsible for future generations. " Like father, like son " is a matter of such everyday observation that it is commonplace, and we fail, perhaps, to appreciate it. In school-work it is possible to do much, not only to bring out the importance of the hereditary factor, but to stimulate the spirit of inquiry into the heritableness of traits, and, incidentally, to sow the seeds of desire for the highest. It is not necessary to arrange a syllabus of work ponderously to deal with heredity : a careful, wise selection of subject-matter, a readiness to make the most of potent illustration, will go far towards infusing school-work with the eugenic ideal. The teacher who realises the possibilities of education for parenthood will be quick to make the most of opportunities.

Nature study, as we have already seen in an earlier chapter, may be a great illuminant. What is it that makes the specks of jelly deposited on water-weeds by a caddis-fly grow into little grubs which can build a home of weed or of sand or of selected snail shells, just as the parent fly did in its grub-days ? What is it that leads the seed from a Red Campion to grow into a red-flowered plant which is open and attractive during

the day, and the seed from a White Campion to grow into a white-flowered plant with the habit of sleeping during the day and opening wide at twilight to cast its sweetness upon the air ?

Why, if we are anxious to have a good garden show, do we insist on getting good seeds from the seedsman ? What do we mean by *good* seeds ? If seeds are diseased do they grow up into healthy, strong plants ? [1]

Then in Botany, an acquaintance with Mendel's work in hybridisation shows the fact of ' recessiveness ' of characters, and also shows how in plants new types may be obtained by a new combination of factors. The ordinary scope of botanical work in secondary school work would not as a rule allow of anything deeper than the attainment of these two steps ; but inquiry is stimulated thereby. " Is it the same in us ? " is an almost invariable question to come from an intelligent pupil.

Biology, however, though extremely important in the part it may play in education for parenthood, both in providing an illuminating approach to enlightenment on sex phenomena and in providing an acquaintance with heredity, is not, by any means, our only hope.

The teacher of Hygiene deals with many questions in a simple, instructive way, and should emphasise the personal obligation of keeping fit and healthy. Lessons on Alcoholism, Tuberculosis, should be utilised to show the effect of these plagues upon society and the race. Physiology should include a brief treatment of the racial organs, given the same measure and method of treatment as the other organic systems receive. Boys and girls should realise that they possess racial organs

[1] See Appendix, " Germination of Healthy and Unhealthy Seeds."

just as they realise they possess respiratory and digestive organs. The approach to Physiology and Hygiene is, of course, greatly simplified by nature study and biologic work. If, then, they realise that they possess racial organs, and that these organs play a very important part in the well-being of the body, they will neither be discomfited, alarmed, nor harmed to know that these organs, as is the case with all the organs of the body, may be subject to diseases more or less special to them. The parallel of tuberculosis may be used—classifying the diseases as 'social diseases.' Just as tuberculosis most commonly attacks the lungs, but may attack other parts of the body, so syphilis and gonococcus infection most frequently attack the racial organs, but the germ may find a hold in other parts of the body. Just as the children of tubercular people tend to be weakly, so do the children of people suffering from the other social diseases tend to be weakly and diseased, if the parents are uncured of their disease. It is all a question of *attitude*: establish the right healthy, moral attitude towards all the body functions, and none need present themselves over-emphatically. If we have been successful in leading boys and girls to view sex aright, and if we are encouraging them to pursue an ideal of conduct which involves an ideal of love and of marriage, the knowledge that they need in regard to social diseases, is mainly what would be sufficient to protect them from innocent infection and to contribute towards their ideal of health. There may be, nay will be, cases of boys and girls who need more information than this to safeguard them. Their problem will be discussed in a later chapter.

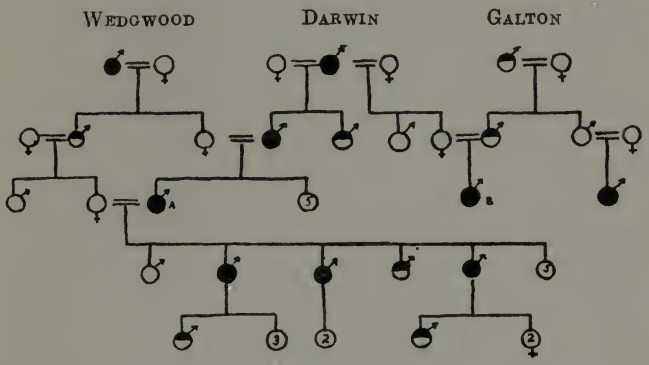
Hygiene, as we need it taught, is intensely personal

in its implication, and with the deepest personal details it is best that the mothers, who see to all the wants of their children, should deal. But the teacher often finds herself (or himself), in the interests of the child, bound to act as mother-substitute, and to give the quiet word wisely spoken.

Literature, History, Geography, may each make their contribution towards eugenic education in the school, while that vague ogre, "General Knowledge," comes, too, to lend its aid to the cause. Perhaps a few examples will serve to show.

A reference to Darwin comes some time or other (or should come, at any rate) into school-work. Why not bring out clearly the fact that Charles Darwin was one of a very gifted family, that his grandfather, Erasmus Darwin, was a poet, philosopher, and physician; his father, Dr. Robert Darwin, a man of extreme scientific ability: that altogether in five generations the family of Darwin (together with the Wedgwoods and Galtons, who were related) produced sixteen men of great scientific ability, nine of whom were Fellows of the Royal Society? Ten of these greatly able men were direct descendants of Erasmus Darwin. Francis Galton, the founder of Modern Eugenics, was a grandson of Erasmus Darwin through the second marriage; Charles Darwin a grandson through the first marriage of Erasmus Darwin.

The history of French Canada supplies an interesting account of systematic colonisation. This system of colonisation, inaugurated by Richelieu in 1627, was formulated with the object of fortifying the imperial power by development of a strong settlement. Only emigrants of the best type were brought into the new land, men of bad character were excluded, early marriage



◓ Shows Man of Scientific Ability.

● Shows Man of Scientific Ability who is also a Fellow of the Royal Society.

⑤ Shows five other Children and so on.

A, CHARLES DARWIN.
B, SIR FRANCIS GALTON.

(By kind permission of Mr. and Mrs. WHETHAM, Authors of *The Family and the Nation*.)

was facilitated, the people encouraged to have large families, and though this scheme was interrupted for a few years during the period when Quebec was surrendered to the English, and again returned to the French in 1632, it was resumed later, with such success that, we are told, the population of French Canada trebled between the years 1664 and 1674. Inter-marriage with Indians was discouraged; the race kept pure, concentrating its worth, with the result that an industrious, true-hearted, rapidly-increasing Roman Catholic population came to find its home in the State.

The development of racial characteristics may frequently be accounted for by and associated with the geographical position of the people. Take the case of a people hedged in by mountains away from the sea—the Swiss, for example, a group of the typical Alpine race. Consider the evolution of their national type of character, due to the geographical limit of their environment and to the manifold ways in which a group of people adapts itself, in the exercise of self-preservation, to its geographical circumstances, perpetuating and intensifying its evolved characteristics by inter-marriage.

In the Scandinavian Peninsulas and on the shores of the lowland countries bordering the North Sea is to be found the typical northern race, split up into national groups, each having developed its peculiar national characteristics. The struggle for existence has been intensely hard in these north lands. Hence we find vigour, endurance, strong physique, perseverance, keen spirit of adventure characteristic of the northern race. But the Mediterranean race, its home in more luxuriously climatic conditions, is typically easy-going, luxury-loving, happy-natured, vivacious, less powerful

in physique than the northern, and less adventuresome in spirit. Hence the supremacy of the northerns, when they have set forth to enlarge their boundaries. Where the races have been comparatively free from admixture we find the characteristic shape of the head, eye-colour, complexion, hair-colour, and stature clearly identifiable, but where racial admixture has taken place, these characters tend to lose their distinctiveness.

In the study of historical characters one is interested to trace the perpetuation of dominating features, physical and mental. The Stuarts were all more or less possessed of a highly-strung and unstable temperament, all the Bourbons had a particularly recognisable nose, Henry the Second showed the double strain in his ancestry, the Angevin and Norman inheritance, while William the Second had the same determination of character that his father possessed, although it expressed itself in different ways.

The foregoing are just examples of the way in which some of the subjects already in the school curriculum may lend themselves to reinforce the idea of heredity as being a dominant factor in the determination of racial and of family characteristics, and their value lies, not so much in the facts themselves, as in the way in which they may serve to awaken and keep alert a vivid thoughtfulness on questions similar and akin. During the years of school age, for the most part, the mind is too immature to cope with controversial matters and to see the actions of individuals in their correct social perspective. Certain definite facts may well find a roothold in the adolescent mind, but the greatest part of education for parenthood which can be achieved during

these school years, while to the young mind parenthood itself, as yet is such a remote possibility, is that which makes for the gradual upbuilding and strengthening of character, mentality, and of ideal, so that, as the years of late adolescence and early adulthood draw near, the ego will be not unprepared for the eventualities which may approach.

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While we are thus striving to raise the ideal of personal achievement, a sense of dissatisfaction with that which is below should make its way into the mind. The law of attraction must always hold good: man will attract woman and woman will attract man. Can we rear our boys and girls in such a psychic atmosphere that they will only be sensitive to and yield to the attractiveness of a personality which is equally inspired as their own? Race culture is, after all, a question of psychology, and Love is the guiding-star. The day may come when Man and Woman are possessed of such a truly sensitised Love that it will unerringly attract only and respond only to the Love of the one who would be the fittest—in the highest sense of the word—to bring that Love to its highest consummation.

Our lives, however, are a tantalising mixture of the psychic and the physical: and we would nurture both.

Boys and girls should lead an active, self-expressive life, regarding it, when they are mature enough to appreciate the sense of duty, as a personal duty to keep fit and healthy. Let them grow up vigorously self-expressive in those attributes which are an asset to the race: discourage the development of those which are anti-social. Let them have full opportunity of finding their highest capacity and developing their innate powers,

so that they may reach their full expression of personality and may secure these traits for the race. The repressed child, forbidden to play, forbidden to make a noise, denied freedom in exercise, discouraged in attempts at doing things for himself, is little likely to develop into a strong, vigorous personality full of independence in spirit and in thought.

Let us now turn to some more purely practical aspects of education for parenthood. What can be done to prepare boys and girls for coping with their future responsibilities as fathers and mothers? In the elementary schools, the boys and girls leave at the age of fourteen: under present organisation of national education most of them pass entirely away from school influence and are left to fend for themselves. So that, so far as the elementary schools are concerned—and that means so far as the bulk of the nation's youth is concerned—what is to be done must be done before the boys and girls leave school.

In many of the schools some lessons in 'Mothercraft' are given to girls, as also are courses of Domestic Economy; and it is encouraging to hear from district visitors and from the teachers themselves that the teaching the girls receive in the schools is making its impression upon the home life. The girls of thirteen and fourteen in the poorer classes are, on the whole, maturer for their age than the girls of the more luxuried classes. Hence education in the sciences of Mothercraft and Domestic Economy are found to be not without valuable result when given to these girls in the elementary schools, and though one would wish that the school-leaving age might be extended, or that part-time attendance might be possible so that instruction

might be carried on for a longer period, there is already every encouragement to persist. Such instruction should be very practical. We should beware of falling into the error of a certain education authority which Mr. and Mrs. Whetham mention.[1] This authority at one and the same meeting passed two resolutions: in the first it forbade parents to keep their daughters from school to help their mothers during the few weeks following childbirth In the second resolution it recommended that part of the school equipment should be full-sized dolls and complete layettes, in order that the elder girls might become accustomed to the care and protection of infant life!

Instruction in mothercraft should recognise the fact that care of the baby begins nine months before the baby is born, and that a mother's responsibilities do not begin at birth of the baby. Recognise this information as coming just in its proper sequence, as part of the general information on sex and parenthood to which every girl and boy has a right, and its valuable import is evident.

The economics of housekeeping is a serious trial to many a mother who would do her best for her family on a small income, and an astonishing amount of ignorance on the question of food values prevails. Consequently we find that children are fed improperly and inadequately, even when the family wage is not wholly inadequate. While girls should learn how to purchase food, how to prepare cheap and nutritious meals, how to manage a house, keep it clean, how to look after children, and generally, how to fulfil a woman's portion in the family life, boys should have a certain amount of

[1] *Heredity and Society*, by W. C. D. and C. S. Whetham.

training which shall help them to understand the economics of household life and fit them to do their share. Handwork is taught in many schools now. Here would be an opportunity of training a boy to be a general 'handy-man' in the house, and not to be ashamed of lessening the household expenditure by contributing his own share to its working. So often it falls upon the wife to be jack-of-all-trades: she papers the walls, whitewashes the ceilings, and does a multitude of things that the husband might do, were he rightly appreciative of his manhood and capable of doing his items. There is already a tendency to teach arithmetic on lines directly applicable to home life—a wholly valuable departure, which should help both boys and girls to realise what it costs to set up housekeeping, what it may cost to carry it on, what may be possible on a certain household income, together with the methods of saving money to the greatest advantage.

Training in what may thus be called briefly 'Parent-craft' should form part of every boy's and every girl's education, whatever be their walk in life, in essentials the same, in detail appropriated to their possible circumstances.

The last ten years have seen a great expansion of interest in health matters: indeed, as Dr. Pritchard says, "It has become the fashion to take an intelligent interest in health matters generally." [1] And in no branch is this more true than in the health of babies. Seventy years ago, the death-rate among babies in some of our largest cities was extraordinarily high. Out of every thousand children born, six hundred died before

[1] *The Infant: Nutrition and Management*, by Eric Pritchard, M.D. Published by Arnold (3s. 6d.).

they were five years old.[1] One of the problems, then, which faces the nation, is not so much the falling birth-rate, but the problem of how to keep alive the babies that are born.

"There are three main channels through which influence may be brought to bear by the State to secure the physical efficiency of children. First, the promotion of healthy motherhood by ensuring proper and adequate attention to the physical condition of the mother herself; second, the promotion of healthy infancy by instructing and training the mother how to bring up her child after it is born, and by providing assistance when she is not able to care for it efficiently; third, the promotion of healthy childhood by means of systematic medical supervision and education in hygiene during school life."[2]

Since 1900, however, there has been a most satisfactory decline in the death-rate of infants, from 155 per 1000 at the end of the nineteenth century to 95 per 1000 in 1912, and though there will be several correlated causes, this decline is, beyond doubt, partly accounted for by the great advance in knowledge of the care and needs of infant life, and the spreading of this knowledge among the people. In London, in 1904, the Westminster Health Society entered into existence and was speedily followed by others both in London and in other parts of the country.

There is now an ever-increasing number of Schools for Mothers, Infant Consultations, Child Welfare Associations, Health Societies, and so forth, where the management and care of infant- and child-life forms the main

[1] *The Problem of Race Regeneration*, by H. Ellis. Published by Cassells (6d.).

[2] See the Sixth Annual Report issued by Sir Geo. Newman, Chief Medical Officer to the Board of Education.

part of educational work done, and through these agencies valuable knowledge is making its way to untutored mothers. The existence and availability of such institutions should be made very widely known, as it may be made known by social workers and others who come into touch with the people who need such instruction. And at school, in connection with mothercraft or hygiene lessons, their work should be made known to the elder girls, so that they, when their turn comes, may not be in ignorance as to where to go for help. Indeed, it might well be impressed that it is a mother's duty to attend these institutions in order to find out whether she already knows the best that it is possible for her to do, or whether there is more for her to learn.

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In an earlier chapter we dealt with certain aspects of training the habit life, and it may not be superfluous here to draw attention to the matter again. The spread of tuberculosis is more rapid among the poorer classes than among the higher and more luxuried classes; partly, no doubt, because of the comparative freedom from overcrowding and other unhealthy conditions which obtains among the richer classes, but also very largely because the habits of refinement which come naturally to those who have had every advantage of training, tend to discourage spread of infection, while among the poorer people, who have had less or no training, we find those whose habits are unrestrained and often unclean, often thus directly contributing to the spread of the social disease, tuberculosis. Of course hygiene and domestic economy lessons should provide many details of instruction, which should help in the crusade against tuberculosis, but the importance of

the personal habit factor must be well in the minds of those who have in charge the training of children ; the habits must be grafted in childhood, the knowledge may come later.

And the same principles carried out will aid in the crusade against the other two social diseases, syphilis and gonococcus infection. Habits of cleanliness, of reserve in conduct, of reticence in the use of other people's or of public toilet accessories should be formed in childhood, so that they may persist as an effective safeguard throughout life.

One more thought in connection with the training of children seems to have a bearing upon our subject. Extravagance in disposition, extravagance in dress, in amusements, should be guarded against. Girls should be brought up to dress nicely and well in proportion to their circumstances, but they should not be encouraged to cultivate an ardour in following fashions and seeking the latest adornment, whatever be the cost. Nor should golf and other pastimes assume predominant importance as one of life's necessities. For it is no infrequent observation to find both men and women who refuse to enter into marriage because they find themselves unable to deny themselves certain luxuries, and cannot afford both—or if they do enter into marriage, they, for the same reason, refuse to have children. Such a spirit is highly prejudicial to the race, and should be discouraged in our nation's children.

There is much to be said in favour of bringing up girls with the idea that they should adopt some profession or some definite occupation. In the poorer classes, there is no question of this : every girl is bound to fend for herself. But in the middle and luxuried

classes the principle does not always obtain, though it is rapidly gaining a wider foothold. Provided that, with such an object in view, a girl does not depreciate the value of domesticity, and provided that her profession is not carried on at the expense of physical and emotional energy which should be conserved for her supreme functioning, then the independence which she so gains is a great asset. She has time to know herself, time to know the world a little ; she is not hurried into matrimony by the idea that if she does not accept an early chance she may be left to a poverty-stricken or lonely old age ; she, secure in her independence, financial and moral, can wait till she meets 'the right man,' who will love her the more, not the less, for her power of waiting.

But—and this applies to boys as well as to girls—those who are responsible for guiding them in the choice of employment should lead them to avoid culs-de-sac, those 'jobs' or posts which carry with them a good wage as a beginning, but which lead to no possibility of extension or promotion, for the day comes when the boy who began so well finds the future barren of promise.

In conclusion, let us note how much may be done indirectly to aid on the cause of education for parenthood. There are many questions, social, legislative, educational, which will have to be faithfully considered by the nation, in the interests of national progress—the increase of degeneracy and its cost to the State, the care of expectant motherhood, the influence of taxation upon the home and the family, the effect of emigration, housing and sanitation, employment of married women, employment of children, and so on,

just to mention a few that enter the mind at the moment. There are many reforms which will come only when they are the demand of an enlightened social consciousness. Those who have the privilege of training children, of influencing their thoughts, of stimulating their mental activity, and of widening their sympathies, will do well to encourage the spirit of inquiry and of thoughtfulness. Civics may provide an impetus to intelligent patriotism, and may train a keen national sense. The intensest and most genuine patriotism will look into the ego first, sure that the foundations of a nation's strength lie in the integrity of its citizens. And if our boys and girls are led to think sincerely upon things that matter, if their initiative and enterprise are developed in a wholesome direction, so that they do not accept blindly all that may be offered for their mental consumption, and if they cherish a hope that they may do and be that which is worthy—then when schooldays are over and youthhood is well advanced we may find the ground ready for planting. Direct information on the advancement of the race, and the part the individual may play therein, will come acceptably and profitably. That is the time for direct eugenic appeal.

CHAPTER XI

Social Safeguarding

There is still another aspect of our problem, to which we should bend our attention. Though the main object of training children towards an upright sex life, and of fitting them, so far as education can enable us to do so, for their possible vocation of parenthood, is a positive or constructive one, and is by far the widest in its influence and scope, we have to recognise the negative or repressive aspect of the problem. Society and social conditions at the present day are such as, in many ways, greatly foster vice, encourage immorality, and place many pitfalls before the unwary and unguided. It behoves us, therefore, to understand some of these detrimental social conditions, so that our good efforts in the positive, constructive direction may not be thwarted nor their results neutralised. For, besides inducing the adolescent towards the true, high conception of the racial functions, we have to safeguard them from the possibilities of social evil. There are many adults, and some younger ones, whose attitude towards the sex life is, by some misfortune of experience, of upbringing, of heredity, or of circumstance, degraded, and from these, and from similar deteriorating circumstances and experiences, it must be our great effort to protect the children we are training. A knowledge

of the enemies we are fighting, of the forces that are against us, will strengthen us and will help us to make our teaching and our care of child-life more securely effective.

Let us consider a question upon which we have already touched several times—the question of venereal infection. There is great need for adolescents having some protective knowledge of sex hygiene. It has already been pointed out how many habits of cleanliness and of reserve in conduct may be formed in childhood, habits which will be a direct safeguard against infection in later life.[1] Again, it has been pointed out that if our method of training boys and girls to have an exalted idea of love, marriage, and parenthood, and all that pertains thereto, is effective, there is small need, if any, to attempt to reinforce our teaching by deterrent or frightening information on the subject of sexual disease. At the same time, they should be informed of the existence of these diseases, so that they may secure themselves from innocent infection, and so that they may take into account the question of social disease in relation to parenthood, that they may understand their own personal responsibility in regard to parenthood. To bring delicate, unfit, or deformed children into the world is not only a sorrow to the parents, but is a crime against the race. It is in this way that the appeal should be made; that, slowly making its way into the general conception of marriage which is formulating itself in the adolescent mind, should come an ideal of physical fitness in every way, which it should be the aim to secure, both in the self and in the partner for marriage. Parents interesting themselves in the prospective marriage of their children usually pay due regard to

[1] See Chapters IV. and V. on "Care of Children" and "Supervision."

the financial conditions which are likely to attend the marriage: the health of the would-be partners is of greater importance, if parents would only realise it. A young couple, in good grace, can cope with the demon poverty, and win, but the demon disease is a mightier foe. Healthy children handicapped by poverty have a better chance of justifying their parents' marriage than have children handicapped by disease. Moral and physical worth should come first; financial worth is secondary.

Who should inform boys and girls on the subject of these particular diseases which play so great a part in racial degeneration? And when should the information be given to them? Before definitely answering these questions, let us take our thoughts back to what has been said before, in Chapter X., and see this information coming into the mind of the adolescent in its correct proportion and in its correct perspective, being just part of the knowledge regarding sex which everyone should have.

The child is accustomed to the idea that we possess racial organs, just as much as he is accustomed to the idea that we possess digestive, respiratory, and other organs. He knows that, for example, the lungs may become diseased, so may the heart, and so may the racial organs. As he grows older, he knows that such a cause of disease as 'infection' exists. Let him then realise that the racial organs may be subject to infectious disease just as the lungs may become infected by certain special disease germs, and that infection may be conveyed in two ways, from one person to another either directly, by bodily contact, or indirectly, by contact with articles which, being used by infected persons,

have become infected. In explaining the nature and effect of these diseases, the parallel of tuberculosis, as has already been indicated,[1] may facilitate greatly. In the ordinary way, one would say that details as to the harmfulness of these diseases should not be laboured upon. Remember it is no part of our general scheme to terrify boys and girls into restraint, though one recognises, of course, that to some natures the restraint of fear is the only one that will appeal, and to such natures, this mode of appeal should be utilised to reinforce the higher appeal. However, speaking generally, it should be sufficient to say that these diseases, if allowed to remain untreated, bring very great suffering in their train, not only to the men and women who may be ill in this way, but to the children they may in time become parent to, if, indeed, they are able to enter into the joy of parenthood at all. The chief way in which these diseases gain a hold upon society is through people who lead immoral lives. We have already seen[2] how one may enlighten boys and girls as to the social evil, prostitution, enlighten them in such a manner that their restraint will be strengthened, yet their sensitiveness may not be crudely injured.

To boys, a frank talk should come earlier than to girls, because as a rule boys lead lives more exposed to social danger than girls do. To attempt to specify definitely the age at which the subject should be introduced, would be valueless. So much depends upon the circumstances, experience, and nature of the children in question. On the whole, one may feel justified in saying that there may be only very exceptional cases where any reference may be necessary before puberty;

[1] In Chapter X. [2] In Chapter V.

and generally, to boys and girls who lead protected lives, about sixteen, seventeen, or eighteen years of age would be early enough. With those who are more likely to be exposed to risks, some information should be given earlier. But, again, I can only say that those who are concerned with the training of children must each judge the best time for themselves, always guarding against being too abrupt or too wholesale in their information, and always facing the matter faithfully in the interests of the children. Many boys, often quite young, are led entirely astray by wrong information given to them by misguided or evil-minded men, among many of whom it is a common idea, that to contract gonorrhœa is a sign of manhood. We must take care of our boys and fortify their bodies and their minds against such possible poison.

Undoubtedly the parents would best talk to their young boys and their young girls about these diseases, if they are ready to do so: just as, to the parents should come the privilege of, in every way directing and inspiring the life of their children. Many agencies — the school, the church, social agencies, etc.—may supplement and aid the work of the parent—indeed, may frequently have to drift or step into the place of the parent. But ideally, we would hope that the father or the mother would deal, in their own gentle confidence, with this question of sexual disease. There may be cases where the boy or girl is dissatisfied with the information given, or may refuse to believe it. Then possibly, the family physician might help. The boy could be told that if he desires to know more or to have the facts verified, Dr. So-and-so will tell him all he wants to know. The school doctor

or the family doctor may frequently in this way, or when some other poignant opportunity arises, seize the psychological moment and help in the task of sex enlightenment. We must, however, consider the question of those boys and girls whose parents cannot be relied upon to help them, for it is just those who stand most in need of help whose parents are least fitted to give it. Here the teacher, the social worker, the scoutmaster, the church-worker, thoroughly understanding his aim, and thoroughly grasping his subject, having a true insight into the needs, emotions, and conflicts of adolescent life, can step in to do the work. Each boy and girl leaving school, might be helped by a short talk from the head teacher or a teacher on the staff, thoroughly competent in knowledge and personality, to deal with the matter helpfully. Girls' clubs could arrange a course of addresses dealing with the subjects of woman's responsibilities, in which sex hygiene, though not described in this technical term, would find a part. In connection with confirmation classes and similar religious meetings an opportunity affords itself,[1] and may be made a very effective means of securing sex integrity. However, the number of youths and girls who come within the reach of social and church organisations is comparatively few. Therefore, one's thoughts fly back to the school as the most far-reaching agent, and one would urge most sincerely that some national step in this direction be prepared for and achieved.

Although the purpose of this book is mainly concerned with instruction of children and early adolescents, one must not leave this question of sex hygiene without

[1] See *Training the Young in Laws of Sex*, by Canon Edward Lyttelton.

emphasising a most important fact in connection with the control of venereal diseases. These diseases, terrible as they may be in the long run, usually yield readily to treatment in the early stages, and this fact should be widely known, so that anyone suspecting themselves to be infected either casually, innocently, or culpably, should in duty bound, seek immediate medical advice and treatment.

We may turn now to the social evil, prostitution, and see what may be done in connection with the training of children to mitigate this great evil. While it is undoubtedly a question of supply and demand, we must look deeply into the social question to find out what it is that leads a girl to adopt such a means of livelihood. The demand is apparently, largely due to a wrong conception of masculine necessity. Hence the demand may be greatly lessened, probably almost wholly lessened, by training boys to know and to regard continence not only as possible, but beneficial, and as an ideal preparation for marriage. A great consensus of expert medical opinion upholds this view.

Now the supply. So frequently one hears a harsh and hasty judgment expressed upon those women who agree, for money, to form the supply. They are unfortunate long before they become, if indeed they do become, evil. Let us see briefly the results of some inquiries into the causes of prostitution, and some of the opinions expressed by social and rescue workers. Dr. Helen Wilson [1] found that in a certain inquiry she made, very few of the women (less than $\frac{1}{15}$ of a total of 669 cases) had adopted prostitution solely because they were naturally inclined to sexual laxity. In a

[1] Paper read at the Eleventh Congress of the International Abolitionist Federation, June 1913.

large number of cases bad home conditions, immoral home life, lack of a home, desertion by husband, were assigned as the reasons for adoption of the life. In another large proportion of cases, low wages, out of work, husband out of work, left a widow, immoral conditions at workplace, were given as the cause. Other factors were compulsion (forced to it by husband or lover, or 'white slave' victim), grief or shock, drink, seduction, vanity, love of pleasure and insufficient means to gratify it. A considerable number of the women in question were mentally deficient, and many were very weak-willed, having no power of resistance against suggestion. These economic, social, and home conditions must be considered faithfully in relation to the question of prostitution. Women's and girls' wages are low—lower than those of men and boys. Their needs in the single life are the same as those of men; their desire for pleasure and recreation the same, and as legitimate. Their pleasures cost the same. A girl, with a natural desire for what she considers her pleasures and vanities, but without the means of gratifying it, is not unlikely to accept what the men of her acquaintance offer her, often only too late realising the return they expect, and if she is unable to face the struggle, to yield weakly. And her first defence and reserve broken down, the adoption of a life of degradation is easy.

Many a girl makes her first downward step in the bewilderment of misery occasioned by anxiety: perhaps she has lost her situation and cannot find another, perhaps she is threatened with destitution through loss of health, or loss of husband, perhaps she is overwhelmed with solicitations and threats by her employer or man-overseer—and in her bewilderment and anxiety

falls an easy prey to one of the many temptations which many youths and men are only too ready to put in her way. Once she has sold her virtue, the downward path is an easy one, for when passion is so aroused, when the moral sense becomes dulled, the path of least resistance is generally the one adopted, while to recover the lost steps is difficult, perhaps well-nigh impossible, if her story becomes known.

The housing question is of prime importance also. In so many poverty-stricken families the housing accommodation is totally inadequate to the size of the family. Father, mother, and the children all may sleep in one room—and not infrequently one corner of the room may be let to a man or woman lodger. Now, what can one expect of girls and boys who are reared in such conditions—conditions which allow them to become acquainted with all the facts of life, birth, and death, long before those who lead sheltered lives in more luxurious homes, ever have their eyes opened to the mysteries? There is no mystery to these unfortunately environed children; all is plain, practical, commonplace fact. Their parents, too, are usually little better than their circumstances, and make no effort, realising no need, to safeguard their children.

Dr. Evangeline Young [1] has drawn attention to a very serious phase of this question of home life and experience of early childhood. She has found that apparently, one of the prime causes of prostitution is the early corruption of little girls. A surprising number of

[1] I am indebted to Dr. Evangeline Young, Director of the School of Eugenics, Boston, Mass., for sending me an account of her investigations published in the *Women's Medical Journal*, October 1913.

little girls are mishandled and subjected to various indignities by men and boys, it may be—most frequently is, no doubt—by men in their own households. Miss Jane Addams,[1] the notable social worker of Hull House, Chicago, bears out this opinion, that very many little girls "have first become involved in wrong-doing through the men of their own households." And again in the quietnesses of country districts, when the children may have long, lonely walks to and from school, many cases of malpractice and offence against little girls take place. And the little girls, bribed or threatened into secrecy, do not or dare not tell what has happened to them.

Now, consider what this means. If a little girl has become accustomed to such experience, if, moreover, she has lived in a house where privacy was not, is it an astonishing thing that she may, when she reaches the dawn of womanhood, fall an easy victim to the snare of general or occasional prostitution? Dr. Evangeline Young found that two-thirds of a considerable number (72) of cases of sex assault, which came within two years of her experience, were committed where the girl was under twelve years of age, while Miss Jane Addams quotes an inquiry into 130 cases where the average age was eight years. Those who work for the rescue of children from undesirable homes, and for the prevention of cruelty to children, bear out these findings.[2]

[1] *A New Conscience and an Ancient Evil*, by Jane Addams (p. 109). Published by the McMillan Co.

[2] During the year 1913–1914 the National Society for Prevention of Cruelty to Children dealt with 965 cases classified as "Corruption of Morals," under this heading including major and minor sex offences against girls, and cases of children whose welfare was prejudiced by their living in immoral surroundings.

These are terrible facts, and facts of which those who have the care and welfare of children to consider should be fully aware, so that their efforts to protect child-life should be penetrative into causes. Mothers in all classes of society, teachers in all types of schools, are called upon to appreciate the risks which lie before little unprotected children, and to make every effort to protect these little ones from possible calamity. The risks are not confined to children of the poor, overcrowded localities only, for, among the more luxuried classes, children who are left too much to the care of thoughtlessly-chosen servants, perhaps of undesirable moral nature, are frequently led astray. When dealing with the question of supervision of child-life, the caution was given then, to choose carefully those dependants to whom one's children are to be entrusted, and this is an opportunity of reiterating that caution, amplifying the caution with the reason for its delivery.

To summarise our points, then, the problem of prostitution is not to be explained away superficially by merely charging every prostitute with degraded sex inclination. It is true that some—but a minority only—do deliberately choose the life—and they are to be pitied for their choice; it is also true that a great many who do make such a choice are mentally deficient in greater or less degree; it is true that some are of an exceedingly weak-willed nature; and it is true that, once having entered into the life, many refuse to give it up, from various causes, their moral sense being weakened, their passions liberated uncontrolledly, their mode of life may be accompanied by many luxuries on which they have become dependent, and which they, with their narrowed moral perspective, refuse to give up; but it

is also true—and true of the majority of cases—that many are the victims, in the first instance, of economic pressure,[1] bad homes in childhood and girlhood, social temptations, compulsion, drink, misery, early corruption, lack of training, lack of knowledge, and all the many factors in home, social, and labour life which go to make moral survival difficult.

It is evident, therefore, that many questions of a social, economic, legal, and administrative nature (*e.g.* housing of the poor, eugenic control of the mentally deficient, raising of the 'age of consent,' etc.) are involved in the solution of the problem, and some of these questions it is beyond the scope of this book to discuss, but, having been introduced, and their bearing upon the problem indicated, they must be left for the reader to appreciate and consider more widely and thoroughly.

However, many of the questions do come within our scope of consideration, and to them we may proceed.

[1] 'Economic pressure' is a broad term, including more than wage conditions, small supply of pocket-money, and similar financial factors: it is the fundamental determinative factor in instances which abound in connection with the illegitimate child. Here the duty of maintenance rests solely with the mother. She can claim, through the police courts, a sum from the father of the child (not exceeding 5s. per week—or its equivalent in a lump sum), but she has to pay the legal expenses in connection with the claim, besides having the difficulty of proving her case, often a very difficult matter if she cannot afford a lawyer's services and the man can. "Charity does nothing to help the girl who has more than one illegitimate child, and the children suffer with her. The Poor Law enforces her to remain a prisoner within the walls of the workhouse so long as her children are there. The only way of relieving herself of their maintenance is to become a prostitute, when the Poor Law takes over the charge of the children." (See an article by Mrs. Cobden-Sanderson on "The Waifs and Strays of England," in the *School Child*, December 1913).

In England, the 'age of consent' is sixteen years. Hence there is no legal punishment for a man who induces a girl of sixteen (or a girl whom he states he had reason to consider was sixteen at the time of the offence) to yield herself to him. So we find it is below this age that the majority of offences consist of minor sex interference. But even at sixteen a young girl can hardly be judged capable of weighing the full responsibility of her actions, especially if she has no correct and uplifted knowledge of the sex life. Hence it is greatly necessary that girls should be safeguarded in so far as wholesome, true information, conveyed to them in all reverence and tenderness, can safeguard them.

The fear of venereal disease and the fear of possible pregnancy may act as deterrents in cases where the moral fibre alone is insufficient to support a strain. But at all costs, give a girl a chance, after one or even many lapses, to rehabilitate herself, to recover her lost position, to recover her self-respect: ameliorate the economic struggle for her that she may not be driven into the mire of prostitution. Society's verdict has been too harsh upon the woman. Boys must be brought up to realise that a lapse on their part is just as weak, just as culpable, as a lapse on a girl's part would be. There must be no dual standard. It is the *act* that counts, not the consequences.

We have already discussed[1] some of the ways in which wise provision may be made in the home, the school, and the social life of children and girls and boys to aid them in leading an upright, healthy life, provision which is, in the main, an indirect and thoroughly valuable aid. A great appeal must be made to mothers to help

[1] See Chapters IV. and V. on "Care of Children" and "Supervision."

them, both to understand the needs of child-life and to do their best to make the most of home conditions to ensure a healthy, moral tone, and to mitigate against possible risks. Even in the family living in one or two rooms only, an enlightened mother can make some provision for privacy, and make some effort to carry out suggestions [1] tactfully and sympathetically offered.

The question of leisure hours is a great problem. Where there is room for it, boys and girls should be encouraged to bring their friends home, and to feel that, in doing so, they have the sympathy and interest of their parents. They will not desire then, to make friends with any of whom their parents would disapprove. Parents who, in later life, have cause to regret that their boys or their girls have formed undesirable attachments or entered into undesirable marriages, have often themselves to blame for not having made their children's friends welcome at home ; their children have thus sought friends and amusements beyond the ken of their parents, who in time, reap their toll of grief. Let the boys bring their girl friends and the girls their boy friends if they wish. Remember that it is natural for boys and girls to seek each other's society, and that it is far better to encourage a healthy comradeship, courtesy, and chivalry than it is to foster subterfuge, clandestine acquaintance, and adolescent 'flirting,' by the unwisdom of ignoring this fact of natural sex hunger.

The dangerous age—the years during which the first lapse of the majority of girls who have been prostitutes occurred—is from sixteen to twenty,[2] and this fact

[1] See Chapters IV. and V. on "Care of Children" and "Supervision."

[2] See Dr. Helen Wilson's paper *On Some Causes of Prostitution*, Eleventh Congress of the International Abolitionist Federation, 1913.

suggests the great need for preventive effort being made on girls between sixteen and twenty. Many of the girls from whom the ranks of the prostitutes are recruited come originally from poor homes, where there was no opportunity—nor indeed any attraction—for them to meet and entertain their friends at home. So they are driven to seek their pleasures with their friends in the streets, and in such cheap amusement places as lie within reach of their resources. A great effort should be made to cultivate a taste for healthy, vigorous occupation of leisure hours—a taste which may be fostered in school as well as at home. There is great need for reform of social opportunities in this way. Let the boys and girls have their choral societies, their gymnastic classes, their clubs, where they may meet and follow up their hobbies; let them dance if they want to. Dancing is a perfectly healthy amusement. But they cannot dance at home, therefore let reputable dancing-rooms be available, under the auspices of social organisations, dancing-rooms which are well conducted, which close at an early hour, where the music is spirited, not slow and voluptuous, and where refreshments may be obtained at a small cost, but where the sale and use of alcohol is absolutely prohibited, for we are only too much aware of the close connection between drink and loss of self-control and judgment. Let us stir up a vigorous social opinion which shall inspire a vigorous Watch Committee to supervise the cheap theatres and picture halls, and see that their cheapness is allied to purity; to authorise the adequate lighting of parks and open spaces, so that the many people who would legitimately enjoy a walk through the parks in the evening of their monotonous, toil-filled day shall not be

deprived of their pleasure because the remaining few might use dark places for immoral purposes.

We must face our social problems frankly. Social workers, teachers—in fact, all who may hope to wield an effective influence over the lives of boys and girls—are called upon to view their lives and circumstances faithfully, and, guided by an understanding of their lives, their feelings, and their needs, to act in ready sympathy and wise conduct. Side by side with this provision of social enjoyment, of healthy occupation of leisure hours, of cleansing and improving the home life, the educational factor must work. Through club meetings, church meetings, various social organisations, through continuation classes, and meetings of old pupils, pure, clear knowledge of sex and parenthood can be conveyed both to parents themselves and to the boys and girls.

One might suggest, also, that short addresses given to factory girls and to men in large factories and workplaces, during work hours, would be another means of doing good educational work, if carried on by those men and women who, by every gift of personality, broad-mindedness, tact, sympathy, faith in the innate possibilities for good of human kind, are fitted for the work.

APPENDIX I

Some Suggestions for Parents on how to Answer Childish Questions and how to Prepare Children for Puberal Changes

CHILDISH QUESTIONS

We all know how quaint and how variable the child's first questions concerning the origin of babies may be. No two children may ask exactly the same question, nor can we say just when it will come. If, however, adults are primed with a thorough knowledge of these things themselves, they should easily be able to put facts in a simple, straightforward way. An imaginary conversation may serve to show.

Child: Where did you get baby, mother ?

Mother: From the same place as I got you, dear.

Child: Where did you get me from ?

Mother: Listen, darling; whose little girl are you ?

Child: Mother's little girl.

Mother: Yes, and who else's little girl ?

Child: Daddy's little girl.

Mother: Yes, darling, you are daddy's little girl, and mother's little girl—and you have always belonged to daddy and mother. Do you remember that you were once not so big as you are now ? You used to be

a *very* little girl. You were so small and weak that you couldn't walk, you could just crawl about. And before that you were so small that you couldn't even crawl. Mother had to carry you about in her arms, and hold you safely there, just as she has to hold baby now. And when you were very little you couldn't eat meat and potato and use a knife and fork like you can now. Mother had to cut your meat up for you, and you ate it with a spoon. And when you were so small that mother had to carry you always in her arms, you weren't strong enough to have meat and potato and bread and butter at all, you could only have milk, just as baby does now, and mother had to make special milk for you just as she does for baby now. You were *such* a tiny, weak little thing. We had to keep you warmly wrapped up so that you did not get cold, and take such great care of you, for you were just like baby is. You couldn't do anything at all for yourself. And before that you were smaller still and weaker still; in fact, you couldn't be out here in the world at all, so mother took care of you inside of herself. You lay in a warm little nest, just under her heart. See, just like this little bean lies cosily in this pod with the warm bean-blanket round it. You *were* such a wee thing. Once upon a time you were just as big as a speck like this (making a dot on paper). But you grew and you grew, getting bigger and stronger till at last you were able to come out into the world and be here with daddy and me—always daddy's little girl and mother's little girl.

Such might be a beginning. It would probably be greatly interrupted by childish comments and ques-

tions: perhaps the tale would only be half told, to be resumed another day.

Other incidents may crop up, giving further opportunity: the arrival of a family of kittens, of rabbits, of puppies may be drawing nigh. "Take care of pussy, darling; don't hurt her."

Child: I'm not hurting her, just squeezing her. I love little pussy.

Mother: Yes, darling, but you may hurt pussy now if you squeeze her like that. For pussy is going to have some little kittens soon—her babies. She is taking care of them, just as mother had to take care of you. You remember how I told you, you were just as small as a speck, and how you had to grow inside a little nest in mother's body? Pussy's kittens begin as little specks too, and she has to take great care of them while they are growing, they are such delicate little things. So we must take care of pussy and see that nothing hurts her.

And later:

Child: Where is pussy? I want pussy.

Mother: Pussy wants to be alone, dear, now, by herself. She does not want anyone to go to see her. For her babies are coming very soon, and she wants to have them all to herself at first. We have made her a comfortable bed, and given her plenty of milk; she will have all she needs till her babies are born.

Child: How *are* babies born? What is 'born'?

Mother: Do you remember how we put some poppy seeds into the garden, and how the little seeds each grew into a big poppy plant? You put some sweet-pea seeds into your own little garden, and they grew up into beautiful sweet-pea plants, some with pink, some

with white, and some with purple flowers. Inside of each seed was a little egg which grew into a plant.

You had some eggs of the stick insect (or silkworm, or some other caterpillar, etc.). Didn't they grow into stick insects, first very wee ones, and then they got bigger and bigger, and we gave them some privet leaves to eat? Where does the baby bird come from? You know that! That the little bird comes out of an egg which the mother bird lays in a nest. The mother bird and father bird make a cosy nest right up in a tree or in a hole under the roof, somewhere out of harm's way. And then the mother bird puts the eggs in the nest and takes care of them. She tucks them under her body in the nest, and sits there patiently, keeping them warm. The father bird looks after her, brings her food to eat, and sings to her. And all the time, inside of its egg, each little bird is growing bigger and stronger, till one day it is big enough and strong enough to break open its shell and come out into the nest.

And all baby creatures were once eggs.

Child: Was I once an egg? Was baby once an egg?

Mother: Yes, you were once a tiny speck, as I told you —that speck was an egg. One day such a wonderful thing happened! Mother knew that a little egg had wakened up in a little nest inside of her, and that you were soon coming to us. We, father and I, were so happy to know you were coming. We took such a lot of care of you. I kept you warm and fed you inside the little nest, and father took care of me so that no harm should come to you. There you lay just under my heart, growing day by day. The little nest in which you lay had to grow too, so that you had plenty of

room. And after you had grown for nine months you were getting quite strong, and one day mother and father knew that the time was coming when you were coming out of the nest. Mother had to stay in bed, just as she had to do when baby came to us, so that the journey out of the nest should not harm you in any way. The nest lies just under mother's heart inside her body, and it has a wonderful passage leading from the nest to the outside. And when baby was strong enough, the passage-way opened, and he was born. That is what 'born' means.

Child: Where is the passage-way?

Mother: In the very safest place possible, where no harm is likely to come to it at all. Our body is such a wonderful thing. You know there are things we need to eat, to put into the body; they go in at one end of the body, the mouth—and the things the body doesn't need, and the things that have to come out of the body, come out at the other end. So in the very safest place possible, just between the thighs, is the opening that leads from the nest, and when you are a little older, hair will grow all around it to protect it still more.

Some parents have found that their children take exception to the nearness of the excretory openings to the opening concerned with birth—this difficulty will be avoided if children are led to view the excretory functions in the right way (see p. 55), and if they are also led to know of Nature's economy—that two openings are never made where one will suffice, *e.g.* we breathe, we drink, and we eat through the mouth. But just as there are separate tubes leading from the mouth to the lungs and to the stomach, so are there separate passages

connected with the one opening where the passage from the kidneys and the passage from the 'nest' (uterus) emerge.

I am attempting here to show how some of the difficulties which appear intense, and which to many people seem insuperable, may be faced and surmounted. If complete confidence between parent and child is to be maintained, these difficulties represent questions which must be faced. Some children may need little detail of explanation; others have that passion for definite information which brooks no denial. And the parent must realise that fact; that if at any point information falls short of what the child's inquiring spirit demands, the child is bound to satisfy its curiosity elsewhere—and a link may be irreparably broken. Not only may a link be broken, but a shade of shame, of irreverence, may be cast over all that should be regarded as dignified and sacred.

The parent must also remember and be consoled by the remembrance, that these points of information which have such an intensely personal interest to the adult, have no such deep import to the little child whose sexual emotions are in the latent condition. Such a little child is seeking information in the same matter-of-fact way in which it seeks all information upon points which its curiosity appreciates; and while every device to emphasise the wonder, the beauty, and the sacredness of the renewal of life, and every emphasis of the dignity of the body should be utilised to the fullest purpose, the actual points concerning the body itself should be given briefly, clearly, and in no disguise.

Perhaps a new baby is coming to join the family. As the time of its arrival draws near, let the children share

the family secret, venerating it; let them know they may expect a little baby brother or sister to join them; let them share in the little preparations that may have to be made; see the small garments that are ready for the visitor; let them know that because mother is taking care of the little baby before it comes to join the family circle, they must take every care of mother—carry things for her, not allow her to stand; in many ways they may be allowed to feel a share in the responsibility involved.

To children who are allowed to share in this joy of forecast, no wrong or shameful impressions are likely to come, no false ideas are likely to find a foothold, for by wisely-given and pure knowledge they are safeguarded from evil. The promise of a new life coming into the world is to them a promise of joy; it is surrounded by a halo of sacredness and of love.

FATHERHOOD

Steps should be taken at school and in the home to provide the necessary biologic approach to the subject of fatherhood (see Chapters VI. and VII.). Some children are very quick to draw conclusions and to apply them to human life; others are exceedingly slow to apply. Consequently the parents may find much has to be explained and re-explained—or, very little may be needed to make things clear to the child. It is better that the physical facts of fatherhood should be explained in the later years of childhood rather than be left till puberty arrives (see Chapter VI.).

"You have been learning at school how seeds are made—you know that seeds are really plant-babies;

that each little seed may grow up into a full-grown plant. You will remember how the eggs lay in the ovary (seed-box) and how each egg had to be joined to a sperm before it could be a seed. You have seen bees and butterflies carrying the sperms from one flower to another, as they visited the flowers for honey; or you have seen the hazels in the spring-time shaking in the wind: how the wind carries the sperms about so that some of them fall on the tops of the ovary and make their way down to the eggs in the seed-box. And you know it takes the two, the sperm and the egg, to make a seed, so that a new plant life may be started.

"Then you know how in the animals the same tale is told (see Chapters VI. and VII.). An egg and a sperm have to join, and so the new creature begins to live. In the mother bird's body, for example, eggs grow, and in the father bird's body sperms grow. You know that the eggs are produced in the ovary and the sperms in the testes (spermary). When the breeding-season comes, the birds go in pairs. The male presses his body close to the female's, and the sperms pass quickly from his body into the opening in hers, and make their way up towards the eggs, and several eggs are fertilised. When the nest is ready, these pass out of the female's body into the nest. You know how the mother bird remains on the eggs, keeping them warm and turning them day by day, and all during this period of 'incubation,' as it is called, the little 'chicken spot' within the egg is growing into a chicken, which at last gets big enough to break open its shell. Many of the chicks are very helpless. The mother and the father birds have to look after them for a considerable time, to give them plenty to eat, and to keep them warm—

and, when their feathers and their wings are strong, to teach them how to fly. The birds take great care of their babies.

"And so it is in human life. People take ever so much more care of their babies than birds do. You know how a little baby grows within its mother's body for nine months before it comes out into the world, and how it was, in the beginning, a small egg. But before the egg could grow into a baby it had to be joined to a sperm. And so you see how it is I told you, when we were talking about babies some time ago, you were mother's little girl (or boy) and daddy's little girl, and that you had always belonged to daddy and to mother, for not only have we both cared for you and nursed you and provided clothes for you and loved you in every way, but we both helped to create you. You will perhaps see now why it is people live in 'families'—father, mother, and children—the children were brought into the world by, and belong to, both father and mother, so it is right and natural that father, mother, and their little ones should all live together, sharing happiness and sharing troubles, and all loving one another. For it was because father and mother loved one another that they married, so that they could bring more love into the world. When the little children come, father and mother are happier than ever, and love one another more than ever, because their hearts are opened wide to receive the love of a little child, and to shower their own love upon their baby.

"And now you will want to know how it all comes about. You know that eggs are developed in ovaries. You saw them in the tulip. In a woman's body there are two ovaries.

"You know that sperms are made in spermaries. You saw them in the tulip also as little pollen grains. In a man's body are two spermaries—at least they are part of his body, just like your ear-lobes are. They are enclosed in a small bag of skin, which sticks out like our ears do. You remember how the opening to the 'nest' is placed in the very safest possible place? So it is with these very delicate organs. They are in the same position in a man's body as the 'nest' opening is in a woman's—the safest possible place. There is a tube leading from the spermaries down which the sperms pass. It is the same tube down which the water which the body has no further use for, passes. It may be used for either purpose, for you know Nature never makes two things where one will do. And by means of this tube, the sperms are placed into the passage-way, which leads, as you know, to the nest. If a sperm and an egg meet, they join, and a little baby's life begins."

The foregoing explanation is a suggestion for the way in which the process of sex intercourse may be explained to children (being adapted for boys and girls accordingly). This explanation should come in the later years of childhood, and the trend of emphasis should be towards the fact that these processes concern adults only, men and women who have married, and whose joy and love are to be completed by children. As time goes on, and youthhood draws nigh, further confidential talk will give the tender parent many chances of fostering an ideal of love and of conduct. It would be superfluous, however, to enlarge here upon this subject; it has already been treated in the main part of the book.

TO GIRLS OF TWELVE YEARS OF AGE (APPROXIMATELY) —FOREWARNING *RE* PUBERTY (see Chapters II. and III.)

One would offer, as a word of advice, that any attempt to forewarn boys and girls about the puberal changes should be allowed to arise relevantly to some circumstance or conversation. Such a talk must come gently and naturally to be valuable, to be received responsively by the child. Any harshness or severity, or any suggestion of it being a lecture or a 'jaw,' will effectually shut the child's mind and heart against inspiration. Plenty of opportunities arise in everyday family life, if the parents will only be wise enough to seize them, or to pave the way unobtrusively.

"You know, dear, from our talks, how babies come into the world, and what a great joy it is to a mother when she has her baby in her arms. She has had to take great care of the little one for a long time before it arrived, and often to give up pleasures which, had she accepted them, might have hurt her baby. But she was glad to give them up, in order that her baby might be safe. Motherhood brings great joy and often great pain, and it is such a great thing to accomplish, that a woman's body has to prepare for it a long time beforehand.

"In a girl's body, as in a mother's body, there is a 'nest' (we call this nest the 'uterus' or 'womb'), but the nest is smaller in the girl's body. When she is about thirteen or fourteen it begins to grow, and comes to be about 3 inches long, and shaped like a pear. It is low down in the centre of the body, above the entrance to the passage-way. And in the girl's body,

as in the mother's body, there are two ovaries in which the 'ova' (eggs) form. But in the little girl these ova are asleep, and stay in the ovaries, and only when she is about thirteen or fourteen do they begin to wake up, and come, one every four weeks, away from the ovary, down a small fine tube and into the nest (uterus), and then it finds its way out of the body without the girl knowing anything about it, it is so small. For the time has not come for it to be used.

"When a girl is grown up into a woman, and is married, it may be that an egg will be fertilised, and has to stay in the uterus to grow. Now you know that if you want to do anything well you have to practise it many times: you play your scales over and over again till you get them perfect; when you first learnt to knit, you were very slow, and found it difficult, but now that you have practised it a lot, you can knit quite well and easily. And so it is with the body. When you were very little you had to learn, slowly and awkwardly, to walk. But you walk quite easily now, without ever thinking about it! So it is with everything the body does. Long before it is ever needed, the ovaries and the uterus have to rehearse their work. Every four weeks, therefore, an egg leaves an ovary—every four weeks, therefore, the uterus has to be ready to receive it. If it were going to stay in the uterus, it would have to be nourished there. You know that everything we eat goes to build up our bodies and to make us work, and you know that all the food we eat has to be changed into our blood before it can be of any use to us. You know that the little baby grows inside of the nest within its mother's body, and that it must be fed, if it is to grow. And so some of her blood goes to

the little growing baby in the nest and feeds it. as it is fixed to the wall of the nest.

"And so, you see, every four weeks the walls of the uterus have to get ready to receive an egg. The walls become flushed with blood gradually collecting there. Now if the girl were a grown woman, and were married, and the egg were going to grow into a baby, that blood would be needed for the baby, but when it is not needed in this way, it just breaks its way through the wall and oozes out, coming away down the passage from the uterus and out of the body altogether, in the way that other things which the body doesn't need, come away. So if some day, you find some spots of blood on your clothing, don't be alarmed about it; it is quite all right. But come straight to tell me, and I'll tell you what to do, to help the uterus to do its work properly."

For Hygiene of Menstruation see Appendix II.

MODESTY AND RESERVE

"God made the world and all that therein is. He made man and woman and all living creatures and plants. He created Life, and He gave to each creature some of His own power—He gave them the power to pass on the Life He had implanted.

"And just because in each boy's and each girl's body there is the power to pass on life, each boy should regard his body as sacred, and each girl should know that her body is holy. No part of it should ever be ill-treated or misused, or touched, except to keep it clean. And this God-given power that we all possess should never be talked about to anyone except to those

whom we hold nearest and dearest—only to father and mother. Little girls who talk to one another about the way in which babies come into the world, or about the way in which the uterus does its work, have not been taught about these things in the way you have; they don't understand how wonderful and how grand it is! Boys who talk and chatter freely about these things also do not look at life in the right way. They have not been taught to regard their power as sacred. But you, who understand it all, and know that these subjects should only be in our deepest, holiest thoughts, will not listen to such talk.

"Every boy and every girl should take great care of these organs which have such important work to do, never to touch them except to keep them clean; never to allow anyone to touch them nor to talk about them. For every boy wants to be a big, strong man, and every girl a fine woman—and it greatly depends upon the health of these organs as to what kind of man or woman the boy or girl will be.

"It is quite possible that things may happen which you don't understand, and are anxious to know about. Always come to mother or father if you are in any difficulty; we will tell you all you want to know."

FOREWARNING BOYS ABOUT THE PUBERAL CHANGES (see Chapter II.) AND TO PUT THEM ON THEIR GUARD AGAINST TEMPTATION TO SEX MALPRACTICE (see Chapter IV.)

Parent: How old are you to-day?

Son: Twelve.

Parent: You are getting on, quite a big fellow.

Getting to be a man soon! By the way, I ought to tell you something about being a man. You remember how we have talked about men and women being trustees of life—how they each have to do their share in bringing new lives into the world? And you will remember that the racial organs have this work entrusted to them. Your racial organs are practically asleep at present, but when you are about thirteen or perhaps fourteen they will begin to waken up. You will probably come to know this. The tube through which the waste water comes away from the body is, as you know, the tube through which the sperms pass also. When the racial organs wake up and begin to produce sperms, this tube swells and projects. It will do this quite suddenly, and a little milky fluid will be expelled. This milky fluid contains sperms; it is called 'semen.' Probably you have already had curious feelings in this organ; they will become stronger. Don't be alarmed when this action of the penis takes place. It is perfectly natural and right. You will understand more about it later on.

Your voice will begin to 'break,' to go low and deep, when the racial organs begin to be active. That is one of the signs that a boy is beginning to be a man. You will probably notice that hair will begin to grow on your face and round the racial organs. Another sign is that 'semen' comes away from the testicles; it is a very valuable fluid, and is stored in two little reservoirs. Most of it is absorbed by the body, and it is only when there is more collected in the reservoirs than the body needs that it comes away as an 'emission,' of which I have just told you. Of course you will see that it is very important to a

fellow's health that he does nothing to waste this fluid, or to make it come away more than it does naturally. For, the body, to release this fluid, requires a certain amount of nervous energy, and that means a certain fatigue or tiredness follows. So if its release is brought about more frequently than the body naturally liberates it, there is an unnatural demand made upon the nervous energy—and no fellow who wants to grow up into a fine, capable man, and to come out top of the tree, can afford to waste or misdirect any nervous energy. In the ordinary way the excess will leave the body once a week or once a fortnight. If it happens more than that, let me know. You may possibly find that many of your friends have not had all these things properly explained to them like you have, and they may talk about them in such a way that you will feel is wrong and unclean. They may do things which will lead them to waste the semen, handle the racial organs in ways which excite them; they may tempt you to do so also. But just take no notice of these temptations. Remember the great trust that is given to a man, how he is the guardian of children-to-be; remember also that if a boy wishes to be a fine, strong, capable man he must on no account waste the semen. When he marries the woman he loves, then is the time for him to use it to help her to bring children into the world, but till then he has every need of it himself. Some boys and perhaps men may give you a bad time, urging you to do things which will be wrong, and even some women may tempt you. I am telling you these things because you are getting to be a man, and it is right that you should know. If you have any difficulties—and you may have, for it's not always plain sailing—remember

that no matter what else you hear, all I have told is right; and if there's anything you don't understand, or anything you want to know further, just ask mother or father about it; or if you are away from home and can't ask us, go to a good doctor or your headmaster at school.

APPENDIX II

Special Hygiene for Girls

For some time previous to the first menstrual period, in addition to the general signs of the approach of puberty (see Chapter II.), various symptoms may manifest its approach—pain in the back, breasts, loins, abdomen; lassitude; sometimes slight sickness or giddiness; headaches, etc. A girl should rest during this pre-puberal period, if these or similar symptoms prevail; above all, she should be relieved of any mental or physical strain, for menstruation is a function which is of such extreme importance to the health of girlhood and womanhood that every care should be taken to effect its right establishment.

Immediately before, during, and after the period, a girl should refrain from vigorous exercise; cycling, tennis, riding, hockey, and similar exercise should be given up for the few days. Gentle exercise in the open air, walking, for example, will be beneficial. Mental work should be lightened as much as possible for the few days. Tight clothing is always unhygienic, and more particularly so at this time, when the abdomen is in a condition of congestion; it may be largely responsible for discomfort and pain attendant upon the period, as well as for irregularity. Regularity of bathing is important.

A warm sponge bath daily, thoroughly cleansing all parts, is very necessary. Painful menstruation may often be caused by constipation (the overloaded rectum exerting undue pressure upon the congested racial organs), and relief is obtained by taking an aperient the day before the period is due to begin; indeed, even in absence of any definite symptoms of constipation, an aperient is often a corrective of irregular and painful menstruation. Relief may also be obtained by soaking the feet in hot water the night before and each night during the period, or by taking a hot bath before the period. Hot baths during the period are sometimes advised. In all cases of bathing, care must be taken to avoid a chill.

Anæmia, physical overstrain, mental overwork, hysteria, chills, indigestion leading to impure condition of the blood, self-abuse, faulty pose in sitting or standing, leading to unequal pressure on the nerves and vessels supplying the sex organs, are some of the conditions which may be associated with painful menstruation, and every care should be taken to prevent these conditions of ill-health arising. Any attempt to remedy painful menstruation, however, must necessarily be based upon a knowledge of the cause, which is frequently difficult to determine—and unless a temporary condition of ill-health may be recognised as being associated with a temporarily disordered condition of menstruation, medical advice on the subject should be sought.

Rest in bed during the first two days if the period is attended by pain and discomfort is often beneficial towards bringing about a healthier condition. Hot drinks, non-alcoholic, are good; but in no case should

alcoholic beverages or drugs be resorted to—they weaken the system, they tend to bring about a debilitating reaction, and, moreover, in this way have been sown the seeds of a drink-taking or drug-taking habit.

Profuse menstruation also may be the outcome of bodily or mental disorders. Rest of mind, freedom from sensual thoughts, and rest of body, again are necessary. When lying flat down, the feet should be raised slightly on a cushion, to be at a higher level than the rest of the body.

During the first year, the occurrence of the flow may be irregular, but, if the general health is good, this will right itself. Later, suppression of the flow may be due to anæmia, to overwork, to anxiety, and some other conditions which medical diagnosis would identify—in addition, of course, to its being the usual sign of pregnancy. In case of anæmia being the cause, plenty of fresh air, good, nutritious food, plenty of fruit, early hours, relief from mental strain, freedom from constipation, are all essential to achieve cure. Very often a tonic may be needed, and this should be taken under medical direction.

Absorbent sanitary towels should be worn, easily detachable from a waist-belt, and changed several times a day, in the interests of personal comfort and cleanliness. Cheap ones, of absorbent cotton, should be burnt immediately after use. Washable ones of soft diaper or Turkish towelling should be soaked in soda and cold water before laundering.

Menstruation is a natural function of the female human body, and should therefore be carried out with as little discomfort and pain as any other of the body functionings. If the digestive system becomes disorganised in its working, and unhealthy, then it forces

its condition upon the consciousness. But in a perfectly healthy condition of the digestive system, beyond the necessity for periodical discharge of useless and waste material, there is no claim made upon the consciousness. And so it should be with the menstrual function. Just as we educate the digestive system in the way it should go, by providing suitable food in infancy, childhood, and by training in correct physiological habit, so is it necessary to exercise intelligent supervision over the physiological training of the menstrual system in its early days of activity, always bearing in mind that general hygienic principles of living (fresh air, night and day, regular exercise and sleep, good food, loose clothing, personal cleanliness, healthy mind, and so on) aid towards health in the performance of this and all functions of the body.

APPENDIX III

Physiology of Human Reproduction

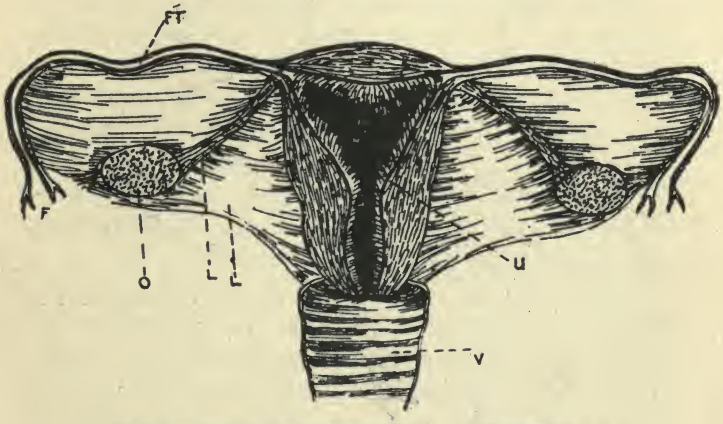
The racial organs are chiefly confined to the pelvic region. The female pelvis is broader in proportion and wider from back to front than that of the male; it is not so deep; the bones are slenderer and of lighter formation.

The principal female organs are the two ovaries (producing ova), the two corresponding oviducts (Fallopian tubes), the uterus (womb), the vagina; these are all to be found within the pelvic basin. The mammary glands (breasts) are situated on the chest wall.

The ovaries are small egg-shaped glands, the size of a pigeon's egg, situated one on each side of the pelvis, well within the lower and front part of the pelvic basin, about 4 inches below the iliac crest and about 2½ inches apart. These glands contain a large number of vesicles, the Graafian follicles; in the interior of each follicle an ovum develops. When an ovum is mature, the follicle ruptures; the ovum is so released from the ovary. The occurrence of the first menstruation is usually recognised as the indication that ovulation (*i.e.* the release of an ovum) has begun. In the ordinary way, one ovum is matured and released from the ovary every four weeks.

This ovum ($\frac{1}{120}$ to $\frac{1}{240}$ inch in diameter) is directed into the oviduct, and thence is passed along to the uterus. The oviducts are fine sinuous tubes about 3 or 4 inches long. They are lined with ciliated membrane, and enter, one on each side, the uterus (womb).

The uterus is a small, pear-shaped organ, the wider



FEMALE ORGANS OF GENERATION. (Diagrammatic.)

U, Uterus (womb) showing the cavity. V, Canal leading to uterus. O, Ovary. L, L, Ligaments, holding the organs in position. F.T., Oviduct (very narrow tubes). F, Fringed opening of oviduct which receives the ova liberated from the ovary.

part being uppermost. It is situated in the central basal part of the pelvic basin, between the bladder which is in front and the rectum which is behind. Its walls are thick and muscular and highly vascular. It is about 3 inches long, and 2 inches wide in its widest part (*i.e.* where the oviducts join it). The internal cavity is very small in comparison with the external

dimensions, owing to the thickness of the muscular wall. The ovaries and the uterus are supported in the pelvic basin by sets of ligaments, which, however, in the case of girls and women of weakened ligamental power, sometimes fail to maintain the uterus in its normal position, and through any slight strain this organ may tend to fall out of position.

The neck of the uterus projects into the vagina, the canal which opens at the surface of the body just below the opening of the ureter. The vagina is lined with ciliated mucous membrane, similar to that which lines the respiratory tubes. Its wall is normally collapsed like that of the gullet when in the quiescent condition, though, like the wall of the uterus, it is capable of great expansion. Its entrance is generally guarded by a fold of mucous membrane, the hymen.

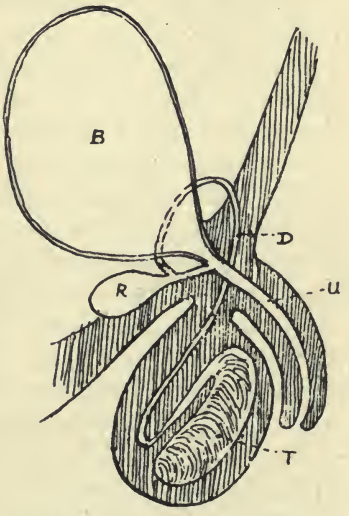
Two folds of skin (the labia majora and labia minora) surround the external orifices of the urethra and the vagina, the outer fold, after puberty, becoming covered with hair. The inner lining of these folds is mucous in nature.

Just above the urethra is a small tubercle of highly nervous constitution; this is the clitoris.

In the uterus, as well as in the ovaries, changes take place at four-weekly intervals; a gradual, increased flow of blood towards the organ culminates in an outflow of blood from the inner wall, together with a release of the inner lining of the organ, and a consequent renewal of that lining. This periodic discharge from the walls of the uterus is known as menstruation.

The mammary glands (mammæ) consist of two lobes of glandular tissue, one on each side of the chest. The work of this glandular tissue is to secrete from the

blood the constituents of human milk, and this fluid is collected up by a series of ducts, which all converge to the nipple, thence to discharge their contents. It is only, however, after the stimulus provided by fertilisation that the mammary glands adopt this milk-producing function, and usually only after parturition that they are ready to release their secretion.



MALE ORGANS OF GENERATION. (Diagrammatic.)
B, Bladder. R, Seminal vesicle. D, Vas deferens passing circuitously from the testicle to join the duct from seminal reservoir. U, Urethra. T, Testicle. R, D, and T are paired.

The essential male organs consist of two testes (or testicles), a tube leading from each, two reservoirs (seminal vesicles), the ejaculatory duct, and certain other appendages. The testicles are the sexual glands, each consisting of about 800 coiled tubules whose reproductive function is to secrete semen, an albuminous fluid of mixed constitution in which float myriads of strongly motile spermatozoids (each a nuclear mass, $\frac{1}{500}$ inch in size, and provided with a vibratile protoplasmic cilium). Both the male and female sexual glands, it will be remembered, produce, in addition to the racial elements, the specific internal secretion which provides stimulus for the

development of the secondary sexual characters and which exerts so great an influence upon the mental and physical condition of the body.

The spermatic fluid finds its way from the testicles along a tube, the first part of which is coiled intricately, the latter part (vas deferens) uncoiled, and is stored in the seminal vesicle.

During embryological development, the male racial organs (except the two reservoirs and their ducts) become extruded from the pelvic cavity, and are enclosed in a skin called the scrotum.

The seminal vesicles lie within the pelvis just beneath the bladder. The duct of the seminal vesicle joins the duct from the testicles, and thence the last portion of this duct (known as the ejaculatory duct) joins the urethra. This tube being thus of double function is enclosed in a muscular sheath (the penis), very nervous, and provided with erectile tissue, which, under stimulus, becomes highly vascular and distended, leading to the discharge of spermatic fluid. The penis may be regarded as a special feature of mammalian anatomy, as an elaborate evolutionary accomplishment which has played an important part in the securing of the species against risk of non-fertilisation, thus making for the perpetuation of the race. By means of it, the spermatic fluid is introduced into the vagina, and the spermatozoids, being capable of rapid movement, make their way into the uterus and possibly to the oviduct.

In the ordinary condition of ovulation, the ovum, finds its way down the oviduct, thence into the uterus, and, being exceedingly minute, is lost. But if, in its journey down the oviduct and through the uterus, it comes in contact with and is united with a sperm, *i.e.*

is fertilised, it fixes itself in a fold of the uterine wall; soon round it, develops a double membrane, and from the moment of conception (fertilisation) a new life has begun.

A fluid forms between the two membranes, and also within the inner one, the embryo being thus protected from injury. The point of fixation of the embryo to the uterine wall, at first obtained by the projection of cilia from the ovum into the wall tissue, becomes increased in area, thickened and vascularised, and is then known as the 'placenta'; through it, by means of the navel cord, the embryo is brought into vascular connection (afferent and efferent) with the maternal blood-stream. Once conception has occurred, the maternal body adjusts itself to the changed condition, meeting the new demands upon its physiological functioning. Menstruation usually ceases, and continues in abeyance till after the period of lactation.

During the nine months that follow conception, a steady development of the new life takes place. By the end of the first month, the embryo may be nearly half an inch long, and is in a curved position; the head is distinguished, very large in proportion. Growth goes on apace, the various body systems becoming differentiated and partly functional. During the fifth month, muscular development has proceeded to such an extent that the 'fœtus' (as it is generally called after the fifth month) has sufficient muscular power to perform small movements: this is the sign known as 'quickening.' From this time, growth in size and in elaboration follows regularly, and during the ninth and final month of prenatal life, the body is becoming prepared for an independent existence.

Parturition (birth) is brought about by contraction of the walls of the uterus ('labour') forcing the fœtus down into the vagina, thence out from the body. The vascular connection between the fœtus and the placenta is still maintained and has to be carefully severed. The double membrane, which has, all during the period of gestation, enveloped the embryo (and its later condition, the fœtus), ruptures, and after birth has occurred, the membranes, placenta, and vascular cord, now useless, are expelled from the uterus as the 'after-birth.' The uterus, which has enlarged gradually to accommodate the growing embryo, speedily shrinks to practically its normal size. With the wonderful adaptability of young creatures, the little baby meets its new conditions of life—change of nutrition, variable temperature, change of covering, and all the many altered conditions which its new environment imposes, and which must be a great test of endurance and vitality, in spite of all that mother-love may do to mitigate the severity.[1]

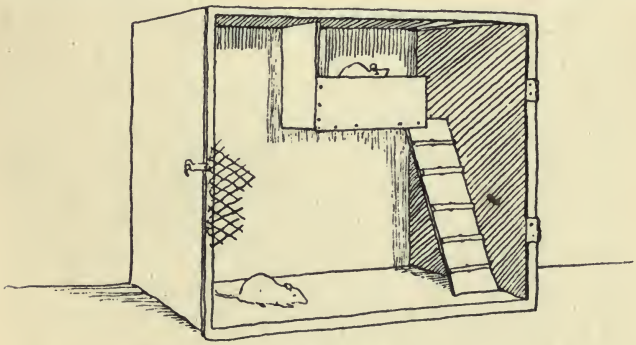
[1] *Woman and Marriage*, by Margaret Stephens (Fisher Unwin, 3s. 6d.), is a simple handbook, in many ways very useful.

APPENDIX IV

Care of Animals—And Some Notes on Plant Life referred to in the Text

CARE OF RATS

Rats require a large, airy house containing a sleeping compartment, and providing space for exercise. A



A Rat Home.

large box may be fronted with wire netting, and a door arranged at one end, or the front may be arranged to open. The bedroom should be small—they do not like a large bedroom—and a simple way to arrange it, is to fasten within the large box, in one corner, a small box, perhaps about 6 inches each way, a small

hole being cut out of one side of it. This little box should be either hung on nails or supported so that it is easily lifted out and cleaned.

The floor of the house may be strewn with sand or sawdust (they seem to prefer sawdust); paper shavings may be put on the floor, and these the rats will quickly carry up to the bedroom; a simple ladder or a small branch may be arranged from the floor leading up to the bedroom if necessary.

Food.—Bread and milk about three times a week, not more frequently than this—bones occasionally to pick at, dog biscuit, hard bread at any time; fresh water, occasional cubes of sugar, a little apple, large seed (parrot seed, wheat, barely, maize), peanuts, etc.

Rats often suffer from "rough ears"; a good remedy is sulphur ointment.

They make delightful pets, become very tame, and are exceedingly energetic. They enjoy, in the summertime, exercise on a lawn. Their habits are interesting to study; the way in which they wash and keep their whiskers clean; the way in which they feed, sitting on their hind legs, holding their food in their front paws and nibbling; the way in which they drink, balanced on their hind legs on the drinking vessel, and scooping up the liquid with their paws.

They are interesting to study as examples of vertebrate structure, and one would suggest, for lines of inquiry, the following points:

What is the use of the whiskers? What is the advantage of the difference in length of hind and front legs? The study of the coat, the different kinds of fur to be found there and their uses. The study of the way in

which the rat moves. Why does it keep its tail out stiff when it is running? The way in which a rat climbs, how it maintains its balance. Can it walk along a horizontal rope? The comparison of the rat—

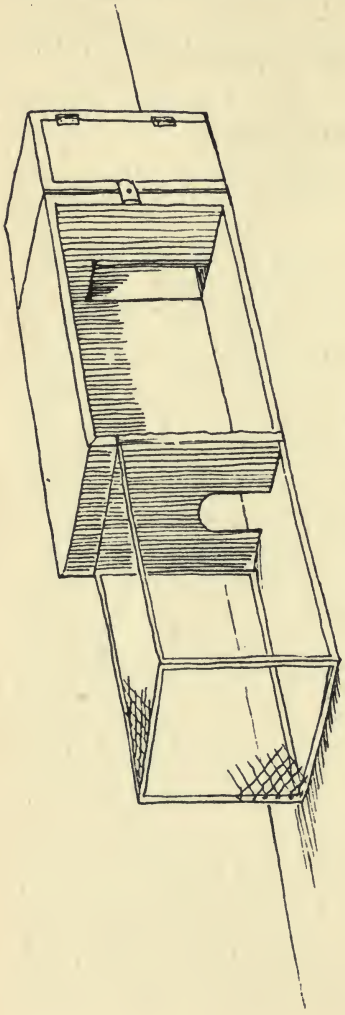
(*a*) With the mouse.
(*b*) ,, ,, guinea-pig.
(*c*) ,, ,, squirrel.
(*d*) ,, ,, rabbit.

Their points of common resemblance lead to their classification as rodents, or gnawing animals.

Tame albino or 'hooded' (*i.e.* white, with dark brown head, back streak, and eyes) rats may be bought from dealers at fourpence to sixpence each. The sexes resemble one another in general appearance: the male, however, shows a slight swelling between the anus and the opening of the racial organs, and a greater distance between the two apertures than does the female. They are very prolific, usually having as many as ten at a litter, the period of gestation being about thirty days, though sometimes apparently less. The young are born without any hair, with their eyes closed, and are very helpless at first. Their eyes open by the time they are about fourteen or fifteen days old, but before this their fur has begun to develop, and they begin to be slightly independent, learning to walk and crawl and clean their whiskers. They 'cut their teeth' when they are thirteen or fourteen days old.

Mice may be kept and reared in ways similar to rats, the great difficulty, however, being that they tend to produce a strong smell. This is to be lessened, however, by supplying them with light food, and milk and water instead of pure milk, and their homes

must be kept very clean and well aired. They are very fond of canary seed.



A Guinea-Pig Home.
Showing arrangement for sleeping- and day-compartment and 'garden.'

Wheel-cages for mice are not at all desirable, as they impose absolute cruelty upon the little creatures, forcing them to perform on the tread-mill.

The period of gestation in mice is about twenty-one days, and the female should not be disturbed when she is about to have a litter, nor within a short time after.

Sometimes the males tend to be rather ferocious and attack the young ones, so it is wise, as a precaution, to separate the males into another house for the time being.

GUINEA-PIGS

Home.—Two boxes may be used, about 2 ft. × 1½ ft. × 1½ ft. each. One box is divided into a sleeping-compartment and day-compartment, the former being narrow and leading by an opening into the latter. The front of the day-compartment should be composed of wire netting. The other box is used as a garden, and the roof and two, or three, sides should be replaced by wire netting. A door leads from the day-compartment to the garden.

This garden should be turfed, and as guinea-pigs are exceedingly fond of grass, it will be found that the turf needs renewing frequently. The day-room should be sprinkled with sawdust, and the sleeping-compartment with hay.

Food.—They like pretty much the same food as rabbits do: plenty of green stuff, and they specially prefer grass, cabbage, lettuce, and radish-tops. One hot meal a day either of boiled potato or bread and milk or bran-mash; oats and dry bread. Two meals a day are usually sufficient.

The 'garden' box gives them a certain amount of scope for exercise, but they should also be given opportunity of having a run every day; if they are allowed to have this in a garden, it should be remembered that they are often difficult to catch again.

The male and female may be kept together constantly, as the male is not ferocious, and does not attack the young as so often the male rabbit does.

The period of gestation is eight or nine weeks, and the mother, towards the end of the time, should have care; hot food always, and bed of hay. The young are born fully developed, with their hairy coat

quite thick, eyes open, and with their teeth well through. The mother provides them with milk for about one or two weeks, but they are very precocious little creatures, and make very early attempts to feed themselves and to walk about the hutch.

It is sometimes noticed that the father shows great interest and care for the young ones, and is particularly attentive to them while the mother has her meals of bread and milk.

Guinea-pigs are nice little pets, although they have not the intelligence and extreme activity which make the rats so fascinating.

Guinea-pigs may be bought for about ninepence each.

DORMICE

The Dormouse is not a real 'mouse'; but is more nearly allied to the squirrel. It is slightly larger than the Domestic Mouse, has much larger eyes, which are very black; its coat is a foxy red, and its tail, different from that of the mouse and rat, is very furry.

A pair of dormice are nice little pets to keep[1]; they are very pretty, and though they are very nervous and easily startled, they may be tamed.

They need an airy box, one side being replaced by wire netting, or some similarly arranged cage, and it should be provided with a sleeping-compartment, which they reach through a small opening. Within this a little horsehair tuft or down and dried moss may be put, and they weave it into a sort of nest.

For food they like corn, seed, parrot seed, nuts (cracked if the shell is hard), small pieces of apple.

As the winter draws on, they go into hibernation,

[1] Price in cage usually from 2s. 6d. to 3s. per pair.

retiring into the nest, and frequently storing up in it a little heap of seeds, with which they regale themselves should they waken temporarily during the winter. By keeping them in a warm temperature, however, the period of hibernation may be shortened or even omitted.

They are most active at night-time and in the dark. They breed in captivity, the young having greyish fur instead of reddish-brown. When they are in hibernation, they should be kept in a cold room and should not be awakened, as they are apt, when so aroused, to be killed.

THE FEEDING OF BIRDS

In winter-time, when the berries are few and when the ground is often hard, many of the birds are likely to be short of food and seek for supplies other than those upon which they usually feed. It is always possible to attract quite a variety of birds to our houses and playgrounds by constantly and regularly providing food for them. The following food mixture, sprinkled upon window-sills, placed upon a bird table, or upon a shelf, yields food for seed-eaters (*e.g.* sparrows, chaffinches), grub-eaters (*e.g.* starlings, thrushes), and, in fact, for most of the birds who are with us during the whole year round. The insect-eaters, as a rule, are here just during the summer months.

	Parts.
White bread (dried and crumbled)	3
Meat (dried and cut up into small pieces)	2
Hemp	4 or 5
Crushed hemp	2
Maw	2
Millet (white)	2
Oats	1

Sunflower seeds	1
Ants' eggs	1
Dried berries (*e.g.* elder)	1
Fat (suet, etc.)	3

This mixture may, of course, be simplified considerably, but, as given above, provides food for a large variety of birds.

Of course, if it is not possible to provide so elaborate a mixture, more simple means of feeding the birds may be employed. Sparrows will eat dry bread, preferably hard. Starlings and tits enjoy old fat, bits of meat, bones with some shreds of meat and fat still adhering. A cabbage-net filled with suet, old fat, meat, etc., and hung upon a railing or a tree is a great source of joy to many of the birds; so also is a cocoa-nut split either in half or with the two ends opened sufficiently to admit of the entry of tits and sparrows and hung on a tree, a pole, or railing. When the white 'meat' is eaten the empty shell may be used to hold seed, bread, meat, etc.

One might suggest that children in country schools would be greatly interested to collect during summer and autumn, the fruits and seeds of wild flowers and store them for the feeding the birds in the winter. Thistle-down is a great favourite with finches.

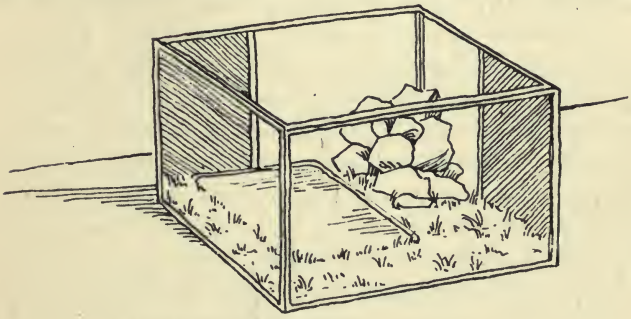
One might also suggest that in the 'handwork' classes at school, varieties of food-trays, bird-tables, food-sticks, and of nesting-boxes might be made by the older scholars. The Brent Valley Bird Sanctuary Committee[1] has some very good designs; a little

[1] For price list apply to the Honorary Secretary of the Brent Valley Bird Sanctuary Committee, Odstock, Hanwell, London, W.

book on *How to Attract and Preserve Wild Birds*, published by Witherby & Co., London, is full of useful suggestions. The Royal Society for the Protection of Birds, 23 Queen Anne's Gate, London, S.W., also invites application for particulars of the nesting-boxes, food-trays, etc., which they recommend.

THE REARING OF FROGS AND TOADS

Toads may better be kept in captivity than frogs, unless plenty of scope for exercise is given, for frogs



AN EASILY-CONSTRUCTED VIVARIUM.

are much more active than toads and require much more room for jumping.

A suitable vivarium may be made out of a large wooden box, part of each end being replaced by perforated zinc to allow of ventilation; the top or side replaced by a sheet of glass sliding in a groove or otherwise made movable.

This box should be turfed out with good thick turf; embedded in the turf should be a dark-coloured bowl (these creatures do not like light vessels); in one corner a rockery can be arranged so as to allow of the frogs and

toads retiring into shelter during the winter. They may hide under the turf or round by the bowl during the winter.

Food.—A supply of small worms, flies, 'green flies,' caterpillars, etc., may be kept in this vivarium, but very often when kept in captivity like this, frogs and toads do not make the most of their opportunity for feeding. It is well, therefore, once or twice a week, or oftener, to place them in a box or covered-in bowl, give them a supply of meal-worms, small earthworms, etc., and leave them for a while, an hour or so. Under these conditions, they generally make a good meal. One frog fed in such a way used to dispose of six, eight, and even nine meal-worms at a meal. Both frogs and toads enjoy daily exercise on a lawn, or, failing this, in a yard or room.

As the cold weather comes on, they will pass into hibernation, and should be left undisturbed; for although it is possible by constantly feeding them to prevent them going into hibernation, an interruption of their normal hibernating tendency seems to impair their breeding process.

When the spring begins, perhaps at the end of February or the beginning of March, they will emerge from hibernation; the male croaks lustily, the female just weakly. They make their way into the bowl of water, and the eggs may be laid. The male, being smaller than the female, is on her back while the eggs are being laid, and as they are extruded from the female's body they are fertilised by sperms from the male.

The eggs when first laid are quite small black globes of $\frac{1}{8}$ inch in diameter, and are enclosed within a film of jelly. This soon swells up in the water, and in the case of frogs makes a large mass of frog spawn. The spawn of toads is not laid in masses but in strings.

The spawn may be transferred to a darkened aquarium or to a dark-lined bowl of water supplied with water-weed, and the development of the egg to the tadpole, and through the tadpole stage to the little frog stage, may be watched, during the next ten or twelve weeks. As soon as the tadpoles are hatched from the egg, that is, about ten days after egg-laying, they fasten themselves on to water-weed, and for the first few weeks of their tadpole life are vegetarian. When they are about six or seven weeks old, they should be fed on a small strip of meat, this being suspended in the water for half an hour or so per day.

By the time they have their hind and front legs developed they will be found to cease eating; their tail shrinks, being absorbed into the blood-stream, and supplying nutriment in that way, and they will frequently and persistently come to the top of the water. They should now be transferred to the water in the vivarium, so that they may come out on to the turf as soon as their lung development necessitates this.

The tiny frogs, now about an inch long, may be fed on green flies, a few leaves infested with these insects being placed in the vivarium each day. They may be so reared till the winter comes and they pass into hibernation.

SPIDERS

A female garden spider will be found in late summer and during autumn in the centre of her web on sunny days in the garden, or on colder days hiding under ivy or in some sheltered place. The males will be found in similar haunts, but they do not spin to any extent, helping themselves to the prey in the female's snare when they want a meal. The male is much smaller

than the female, more conspicuously coloured though, and with the same characteristic marks, and may be distinguished by his narrow abdomen and the conspicuous 'knobs' on his feelers. These 'knobs' characterise all the male spiders. The mature female spider has a small pointed projection, pointing backwards, on the lower surface of the abdomen, near the junction with the chest. This is the organ ('ovipositor') by which the eggs are dropped into the cocoon.

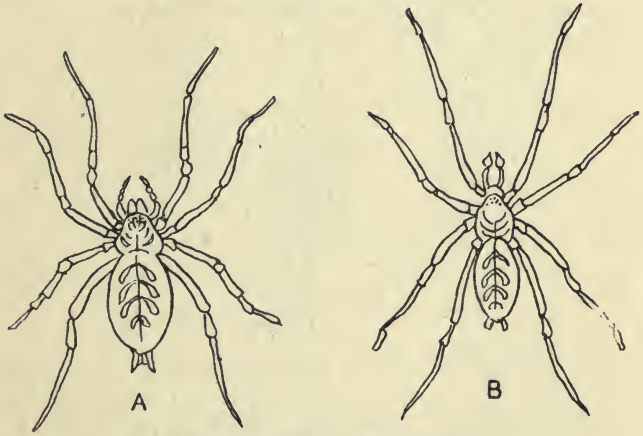
The male and female spider should be placed in a *large*, ventilated, glass-topped box. Put in a few leaves infested with green flies for food, and it is very often possible to get the life-history of the spider studied in this way, although, because of the naturally ferocious tendency of the female spider, one may be disappointed and find she has attacked the male and killed him, especially if the box is small. In such captivity web-construction is carried on, but the garden spider fails to follow its usual plan of making a regular orb-web.

Fertilisation is effected by the male transferring the sperms by means of the organs at the ends of his feelers into the abdomen of the female. In this way the eggs are fertilised, and the female, constructing a silken cup, drops into it a large number of small, pale, orange-coloured eggs. She then weaves a top to the cup, the whole cocoon being specially moored into a corner of the box. Shortly after this, usually both the male and female die, exhausted by their reproductive effort.

The cocoon may be kept under observation till the eggs hatch, which will probably be some time during the following spring.

The male and female house-spider may be kept in a way similar, their breeding-season being

in June and July usually. Water-spiders may be kept in an aquarium. They are best kept by themselves. The male is larger than the female. The female constructs a beautiful dome-shaped web among the weed, and in this case the web is used as a nest, the eggs being laid within the upper part of it in the late summer. During the breeding-season the male, too, constructs a small dome, quite near the female's.



HOUSE-SPIDER (TEGENARIA DOMESTICA).

A, Female. B, Male. They vary in size considerably. The female may be $\frac{5}{8}$ inch long in the body, the male $\frac{1}{2}$ inch long in the body. In colour dull brown, with blackish markings.

Here again, in the case of water-spiders, one may be disappointed, for sometimes the male attacks the female and kills her.

THE REARING OF CATERPILLARS

In hunting for caterpillars, one should examine plants which show signs of the ravages of these larvæ. Such

plants will be eaten at the edges, or between the veins, and if the larvæ are not immediately seen, one should hunt under the leaves and within the buds. Some caterpillars are adepts at hiding themselves; some drop on a silken thread when they are startled. Certain species are to be found in the soil.

ARRANGEMENT FOR OBSERVING THE LIFE-HISTORY OF CATERPILLARS.

It is well to know that many caterpillars have their bodies clothed in thick or fine hairs, and these hairs often have an irritating effect upon the skin, so it is advisable to wear gloves when hunting for these creatures.

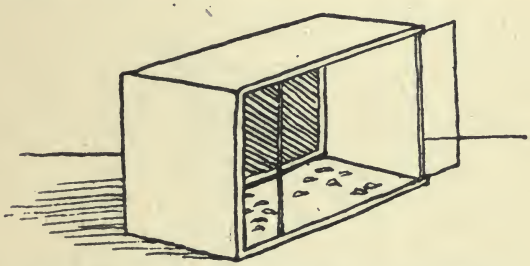
Having found the caterpillars, secure some of the food-plant (that is the plant upon which they are found feeding) and place them in a tin or cardboard box for conveyance home. The box should have a well-fitting lid, as many caterpillars are comparatively strong, and can raise an ordinary cardboard lid and escape.

A simple vivarium in which the caterpillar can be studied easily is made as follows:

A bottle of water is corked, through the cork a twig of the food-plant is inserted, passing well into the water, and on this the caterpillar is placed. A fine black muslin bag is made to enclose the twig and to draw up closely round the stem. The caterpillar is thus

supplied with plenty of food and secured from escape, and can easily be studied through the muslin. This is particularly useful for the study of those caterpillars which need their food in a growing condition.

Some caterpillars, for example, those of the Large Cabbage Butterfly, of the Lesser White Butterfly, of the Underwing Moth, all to be found on the cabbage, are content with fresh supplies of leaves daily. The larvæ of the Dot Moth, to be found on geraniums, prefer growing twig. The Buff Tip larva feeds on



A Simple Larva Case made out of a Chalk-box.

leaves of lime and other timber trees, the Buff Ermine on foliage of kidney bean plants.

A simple observation-box may be made out of a wooden chalk-box, the back being replaced by perforated zinc or black muslin, the lid by a sheet of glass (one half-plate negative or two quarter-plates fit into the grooves of an ordinary chalk-box, and, cleaned by soaking in boiling hot water and soda, may easily be used up for this purpose).

When a simple observation home has been prepared, the structure and habits of the caterpillar may easily be observed. How it eats, casts its skin periodically (because its skin, being composed of chitin, does not

stretch to accommodate the increased bulk, due to its heavy feeding), how it moves, its different types of legs and their uses, how it behaves when disturbed, its sense of smell, of hearing, of sight, may be all investigated by simple experiments.

Before it is going to moult it usually seeks a somewhat sheltered part of its food-plant or box, and rests perfectly still for a period of some hours, perhaps for a day, before casting its skin. After the last moult it does not make a new skin, but, drawing its body up so that it becomes shorter and broader, a thin gummy liquid exudes from the surface of the body, and this gradually hardens into a more or less horny covering. The caterpillar is now known as a 'pupa' or 'chrysalis,' and in this condition it remains for some time, perhaps for a few weeks, or perhaps for months, according to the time of year, and according to the species.

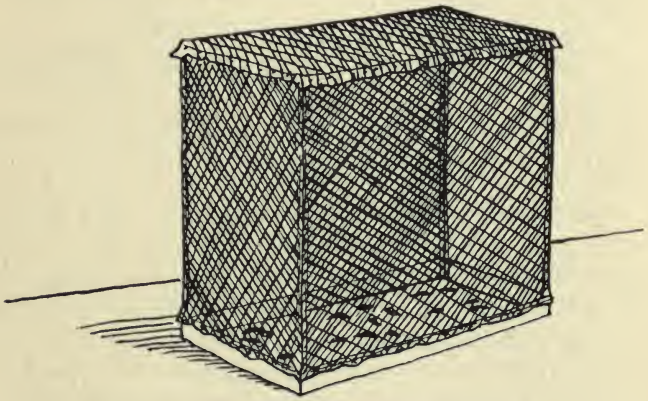
The Cabbage Butterfly caterpillar, pupating in June or July, may hatch in a fortnight, whereas those of the same species which pupate in September do not hatch in the ordinary course till the following spring.

Before going into pupation, many caterpillars fix themselves firmly on to some foundation by a silken thread; others weave a silken cocoon round their bodies, and go into pupation in this.

The Buff Ermine larva makes a cocoon, so does the 'silkworm.' The Cabbage Butterfly caterpillar, the Underwing Moth, and the Magpie Moth larvæ do not make cocoons. The Underwing Moth larva out of doors makes its way to the ground and pupates in the soil, but kept in captivity, usually creeps under leaves or paper in its home; the Cabbage Butterfly caterpillar pupates on cabbage leaves during the early summer; during the late

summer and autumn it makes its way to some sheltered wall, railing or barn, and there pupates.

When caterpillars have gone into pupation, a simple pupa house may be arranged out of a box, uprights, and muslin. Within this, on sand or sawdust, the pupæ should be laid, and when they hatch, the imagines (as the adults are called) are retained. It is very often wise to introduce some of the food-plant, either fastened in a bottle, or otherwise supported, and one is very



A Pupa-House.

likely, as the males and females are produced, to find the eggs laid on the leaves of the food-plant and the life-history to start once more. This is particularly so with the Magpie Moth, which, besides feeding on the gooseberry bush and currant bush, is frequently to be found on Euonymus in the autumn. These autumn caterpillars live in an almost hibernating condition over the winter, grow rapidly in the spring, pupate as yellow and black banded pupæ hanging on the under

side of the leaves, or on the twigs, and, if reared in a suitable vivarium, where the twig is growing, shortly after the adult moths emerge from pupation, the eggs will be fertilised and laid on the leaves of the twig.

Diary of Magpie Moth Caterpillars kept under Muslin Bag

October 21, 1913.—Caterpillars of Magpie Moth found in Euonymus shrub—removed to vivarium.

May 22, 1914.—They went into pupation.

June 17, 1914.—Some of them emerged as adult moths.

June 24, 25, 1914.—Eggs found deposited on the leaves of twig. Adults died.

Many moth larvæ pupate under the soil. This is the case, for example, with the Cabbage Moth larva, the 'Surface' caterpillars, many of which are to be found in cabbage 'hearts,' Buff-Tip Moth larvæ, and some others. They will be found, in captivity, to pupate under the leaves of their food-plant, or under the paper lining their box; or if a pot of soil or layer of soil is arranged in their vivarium they will pupate in that.

To keep these pupæ in a pupa-house for observation, and at the same time to secure the right conditions of moisture, a layer of damped moss may be placed over the pupæ, it being remoistened as necessary. Another plan is to embed in the centre of the soil or sand forming the floor of the pupa-house, a porous pot kept filled with water; a small plant-pot with the hole at the bottom filled up by a cork answers very well. The Buff-Tip Moth does not hatch till about June or July.

Silk-bearing moths may be reared from the eggs, with comparative ease, if care be taken to prevent the larvæ from being chilled. The eggs of the silk-moth (*Bombyx mori*) cost usually fourpence a hundred. They are usually supplied on sheets of paper on which they have been laid by the female moth.

They should be placed in shallow cardboard boxes—box-lids usually do very well—and covered by a sheet of glass or placed within a breeding cage. At a temperature of 60° F., or slightly over, the eggs hatch, tiny black caterpillars coming forth. These should be fed on mulberry leaves, or if these leaves are unprocurable, finely-chopped cos lettuce leaves. The young larvæ feed very voraciously. When it is necessary to clean the tray, which should be at least every other day, place fresh leaves over the silkworms. The majority of the larvæ will crawl on to these leaves; the remainder transfer by means of a camel-hair brush to the fresh, well-dried food leaves. Silkworms are somewhat delicate. They should never be handled, and should be carefully protected against change of temperature. They moult four times, and prior to the fifth moult seek a sheltered corner. When this is observed, the silkworm should be gently transferred to a paper cone, and this fastened up on the wall of the breeding-box. In this, cocoon-making and pupation will take place, and about twenty-one days after the cocoon is finished, the silk-moth makes its way out. The adults do not feed; if males and females are kept together for the few days of their adult life, the eggs may be fertilised and deposited on sheets of paper arranged in the case to receive them.

STICK INSECTS AND SOME RELATIVES

These relatives of the Earwig and Cockroach, although not truly British species, are very easy to rear. The eggs may be procured from dealers.[1] They look like small brown seeds. They require no special treatment, simply to be placed in a box or watch-glass or within a breeding-cage, and kept in a warm room. Twigs of privet (their food-plant) should be arranged over them, and the whole covered by a bell-jar or jam-jar.

Some varieties feed very well indeed upon ivy.

They all feed very greedily, except while they are preparing to moult, and during the process.

The male and female earwigs (harmless creatures, really) may be distinguished by the pair of pincers projecting at the end of the body, those of the male being stronger, thicker, and much more sharply curved than those of the female. The eggs are to be found in the ground just underneath the surface, or on the surface of the soil, at different times from autumn to early spring. They are pale yellow clusters, and the female seems to watch over them till they hatch, and to some extent over the young larvæ. The females seem to die in the spring, after the eggs hatch.

The cockroach—the so-called 'black-beetle'—is not a great favourite. Yet because it is so common, and may provide convenient illustration, it should be mentioned here. The males are smaller and narrower than the females; they possess a pair of stiff wing-cases, below which are folded a pair of membranous flight-wings: the female cannot fly at all; she possesses only

[1] L. W. Newman, F.E.S., Bexley, Kent, supplies them at 3d. a dozen (postage 1d.).

small, half-formed wing-covers, and no flight-wings. The eggs are laid during the summer. Sixteen are placed together in a small, dark brown horny capsule a little over quarter of an inch long. The female may often be seen running along with this curious purse-shaped capsule attached to the end of her body. She finally drops it in a sheltered corner, and in time the eggs hatch, and the young, little, pale cream-coloured creatures, make their way out of the capsule.

SNAILS AND SLUGS

Both snails and slugs are more easily found in damp weather than in dry. In cold and also in dry weather they are to be found under stones, buried in the soil, under old wood, and in various sheltered corners. Slugs often bury themselves during the daytime under the earth.

To secure a large number of slugs for observation the following plans may be adopted:

1. Cut a turnip in half, scoop out the centre, and embed it in the soil where the slugs are known to frequent. The edge of the turnip should be slightly below the level of the soil. If this is done one day, or during the evening, the next morning a large number of slugs is usually to be found within the turnip cup. A similar trap may be made by using a large cabbage or lettuce leaf.

2. Ordinary paling-boards, laid over-night along the sides of flower-beds, where slugs are known to be, when turned over next morning will be found to have many slugs adhering to the under side.

A simple vivarium may be constructed: a box with

one side replaced by glass, and ventilation provided for by replacing part or all of two opposite sides by perforated zinc. The lid of the box should be secured, for the creatures are likely to escape if the box is uncovered. This box should be turfed out, a little rockery arranged at one end, and the turf kept nicely moist. Both snails and slugs may be kept in a box like this for observation.

Food. — They should be provided with vegetable food such as they are known to select from the neighbourhood. Snails sometimes like a little bread.

As the cold weather comes on, both slugs and snails go into hibernation. The slugs bury themselves in the soil, and the snails retire under a rockery or stones or fix themselves in a corner of the box, withdrawing themselves entirely into their shell and exuding mucus over the opening of the shell. This hardens and forms a protective covering for the winter, just a small opening being left through which slight respiration can take place.

The reproduction of snails and slugs has already been dealt with in Chapter VI.

Most snails and slugs are vegetarian; there is, however, a small species—*Testacella*—which is carnivorous. It feeds on earthworms, and follows them into their burrows. It is small and greyish in colour, and may be recognised by the presence of a small, ear-shaped flat shell at the hind end. This species is found frequently on asparagus beds. It may live for four or five years. The eggs are laid separately, six or seven only being laid.

All snails and slugs are hermaphrodite, and all require cross fertilisation. They belong to the class Mollusca, and are, on the whole, sluggish animals.

The mass of muscles, of which the main part of the body is composed, is known as the 'foot.' In the snail, the main organs of the body are contained in that part of the body which is hidden in the shell.

The habits of snails and slugs are interesting; their method of movement may well be observed by allowing a snail to crawl over a sheet of glass, and from the under side the muscular parts may easily be seen. The mouth can also be watched. Their favourite food can be found out by giving them a selection. The shell, consisting of three layers, is formed by the 'mantle,' the fold of tissue which lines the shell.

The slime given out from the body of the slugs and snails is specially protective, and if it becomes dried up, the creature will suffer very severely, and probably die, and it is to avoid this that the creatures retire under stones and into sheltered places when the weather becomes very dry.

Snails are inclined to hibernate gregariously. Often several of them will be found united by congealed slime.

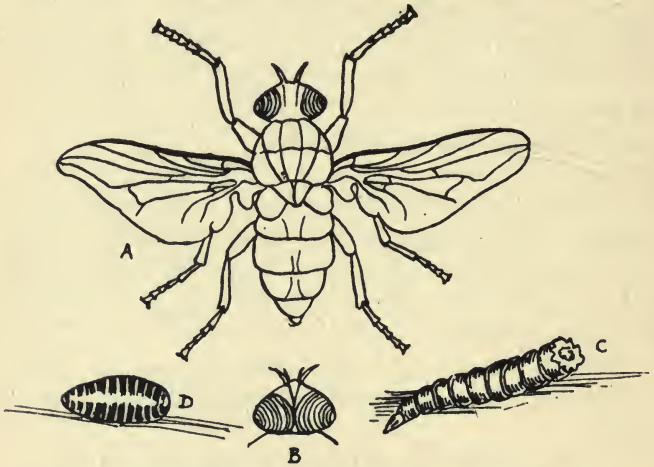
An interesting observation is to measure the rate of progress made by the snail towards various food-stuffs. For example, it is frequently found that it will move quickly towards strawberries and turn away from onions.

A comparison of the weight-carrying power of a snail with that of other creatures may easily be made. For example, the addition of plasticine to the shell until it is no longer able to move under its burden. Then the weight of the snail and the weight of the burden it can carry may be obtained, and some idea of the proportionate carrying-power of the creature may be estimated.

Water-snails may be studied and compared with the land-snails. Water-snails are easily kept in an aquarium.

THE LIFE-HISTORY OF THE HOUSE-FLY

Place on a clean glass slab or plate several pieces of stale bread and shreds of old newspaper, all moistened,



STAGES IN THE LIFE OF A HOUSE-FLY. (All enlarged.)
A, Female fly. B, Head of male fly showing the position and size of the eyes. C, Maggot (cream-coloured, natural size ¼ inch approximately). D, Pupa (brown, natural size $\frac{3}{16}$ inch).

and one or two bits of dark cloth, all heaped up. Cover with a long pint tumbler. Catch some flies either by a swift sweep of the hand or in some fly-trap which will catch them without killing them. Fling them on to a flat dish of water; this wets their wings, so that they may easily be examined and transferred under the tumbler.

Having caught the flies, examine them as to sex.

The eyes of the female are apart from one another; the feelers are short and not so profuse as in the male, whose eyes almost meet on the top of the head, and whose feelers are sturdier than those of the female.

In the course of a few days, some flies' eggs will be observed if carefully looked for. They are laid in heaps, sometimes end to end, and some may be found and more easily seen on the dark cloth than on the bread or newspaper. In a few hours the eggs become minute headless, legless larvæ (maggots), which rapidly grow in size, and can often be seen moving up and down the sides of the glass. When full grown, the larvæ pupate, remaining in pupation a varying time according to the temperature. In hot weather the whole growth from egg to adult fly may take place in eight days, though usually from ten to fourteen or up to twenty days is required.

The life-history of the blue-bottle (blowfly) may be studied in the same way, but instead of bread and paper a small piece of meat should be placed under the tumbler.

House-flies usually lay their eggs in refuse heaps. There the larvæ live and pupate, and, as adults, make their way back to the haunts of man. It is because of this habit of living part of their life on refuse heaps that they come to be so dangerous as carriers of disease.

Many of the adult flies hibernate over the winter. Hewitt found that flies become sexually mature in from ten to fourteen days after emergence from pupation, and that the female deposited eggs four days after fertilisation. This was in captivity, and it is possible that when free these periods are much shorter.[1]

[1] The *House Fly*, by L. O. Howard. Published by John Murray.

EARTHWORMS

A good time to begin the study of earthworms is in the autumn, for their work as Nature's ploughmen is very evident at that time.

Digging in the soil, one can obtain as many earthworms as one wants for this work. Their habits may be studied experimentally by arranging wormeries, observationally, out of doors. On a lawn or in a garden may be seen the leaves from the trees pulled into the ground, point first, by the earthworms; the fine worm castings heaped up on the surface of the soil show the work done by the creatures in pulverising the soil and bringing the lower layers of soil up to the surface. At night-time one can go out with a lantern and see many worms on the surface of the ground, but they seem to scurry away quickly when the light is flashed on them.

Wormeries may be set up to show (*a*) the way in which the earthworms turn over the soil. An inverted bell-jar or glass-fronted box may be arranged as follows: Layer of sand, then the earthworms placed in, layers of sand, soil, chalk, soil, dead leaves, and soil; the whole should be well moistened, and drainage allowed. The box, when not in observation, should be turned with the glass towards a dark wall, and the bell-jar provided with a strong brown paper cover to shade it. In time—some days, or it may be weeks—earthworm tracks will be seen, the layers will be considerably disturbed, and the leaves will be pulled in and buried.

(*b*) To find the favourite food. A wormery may be made of sand or poor soil and equal amounts of various food-stuffs put in, *i.e.* potato, sprouts, carrot, and so forth, and as time goes on it can be seen which food the

earthworms prefer. The food should be placed next to the glass in full view, and the glass darkened when not under actual observation.

(*c*) To determine whether they are sensitive to light. Another wormery may be constructed, half of it covered with a dark, light-proof cover. In due time it may be observed whether the earthworms work more freely in the darkened half or the light half.

Reproduction.—Towards April, the part of the body in front of the swollen 'saddle' will be seen to be enlarged, and the racial organs shine through as cream-coloured masses. Cross fertilisation takes place, the sperms being stored temporarily in two 'storehouses' (seminal vesicles), the eggs later being laid in a small cocoon formed by the saddle and sperms passed over them. The cocoon is then closed up. It is under ¼ inch in diameter, is usually white at first, but soon turns yellow or brown. There may be several eggs in a cocoon, but as a rule only one hatches, and thrives at the expense of the others.

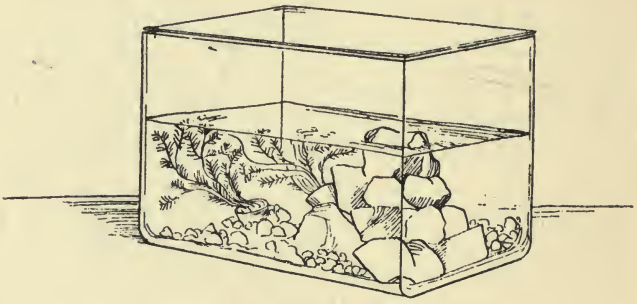
Other interesting points in connection with the study of earthworms are the structure of the body, method of movement, use of the bristles, nature of the slime, investigation of its powers of hearing, sight, smell, rate of movement, and so on.

THE MAKING OF AN AQUARIUM

A glass tank, rectangular, 16 inches long, 12 inches deep, 10 inches wide, makes a good size for ordinary purposes, but, of course, smaller tanks will do for small animals like water-slaters, water-boatmen, and small water-beetles; for sluggish ones like snails and mussels,

an inverted gardener's bell-glass, supported in a block of wood, will do.

The bottom of the tank should be covered for a depth of about 3 inches with sand, and then a layer of pebbles, or all pebbles will do, or all sand. Both sand and pebbles should be boiled in water for one hour before being used for the tank, and then, after cooling, should be placed in the tank as described. A little water should be run in gently, and then drawn off by a siphon-



AN AQUARIUM.

A glass cover may be arranged to rest on small slips of cork cemented on to the edge. In this way air is allowed to circulate, though the tank is protected from dust.

tube, this process repeated several times to ensure absolute cleanliness of the gravel.

Then water-plants should be weighted down into the gravel. They may be fastened securely by being tied to a piece of stone or rock which has been previously boiled, or a piece of lead tubing twisted round the stem answers very well. Some plants, *e.g.* Tape-weed, Water Violet, Water Crowfoot, which have a decided rooting-habit, do better if they are planted in a small pot of

soil, a layer of pebbles being pressed down over the soil to prevent it from mixing with the water. The pot may be concealed in the rockery or embedded in the pebbles. Water-weeds should be obtained from a neighbouring pond, if possible, or purchased from a dealer. The following are very good: Canadian Pond Weed (*Elodea*), Tape-weed (*Vallisneria*), Water Violet, Water Crowfoot, Hornwort, Water Milfoil, Water Starwort.

Crystalwort, Duckweed, Fairy Floating Moss are all suitable for floating on the top of the water.

A rockery (allowing for shade and caves for those animals which seek shelter) should be erected in the centre or in one corner, the precaution again being taken to sterilise the stones by boiling. The rocks should be erected to above the surface of the water, to allow of amphibians, *e.g.* newts, coming out of the water as they desire.

A good supply of water-weed is necessary, the usual proportion which is found to be successful being—comparing the bulk of the plants with the bulk of the animals—the bulk of the plants should be a hundred times that of the animals.

The water-weeds give off as their waste product, oxygen, which the animals need for respiration, and the animals give off as their waste product, carbon dioxide, which the plants need for food, and if the balance of life is perfect in the tank, that is to say, if the plants and animals are in right proportion to supply each the needs of the other, there is little need to change the water in the tank.

Having planted the weeds, the tank should be left for a fortnight or so, and if at the end of that time

the plants are growing well, it is safe to introduce the animals, care being taken to avoid over-population.

Dragon-fly larvæ, water-beetles and their larvæ, water-boatmen, are best kept by themselves, because they are carnivorously inclined and fierce, frequently attacking the other inhabitants of the aquarium.

The largest English water-beetle, the large Silver Water-beetle, is, however, vegetarian, and may be kept very well along with Minnows, Sticklebacks, and so on. Snails are also vegetarian.

Feeding.— Minnows, sticklebacks, goldfish, all eat ants' eggs, finely crumbled vermicelli, or patent fish-food. Newts can be trained to feed on ants' eggs too. It is well to put into the tank some pond water containing quantities of minute water crustaceans and other small animals, tiny worms, and so forth, for these form suitable diet for many of the aquarium inhabitants.

The carnivorous creatures need fine strips of meat. Most of the caddises are vegetarian, but a few species, particularly those which build their tubes of fresh green weed, seem to be carnivorous.

Tadpoles feed on water-weed. When they are about seven or eight weeks old they should have a little meat suspended in the water for half an hour a day.

To keep the aquarium healthy, care should be taken to remove daily any uneaten food, any débris, dead leaves, etc. These may easily be removed by a siphon-tube.

If the tank is not well aerated, that is, if the supply of plants is not sufficient,or if decaying matter is allowed to stay in the tank, a water fungus (*Saprolegnia*) develops very quickly and infects the live stock, killing them off. Such an infected condition is recognisable.

The animal, dead or living, becomes coated with fine hairs, like mould on bread.

For fuller details on the care and management of an aquarium, see School Nature Study Leaflet No. 11, to be obtained from the Secretary, School Nature Study Union, 1 Grosvenor Park, Camberwell, S.E. *The Aquarium*, by Bateman, *The Fresh-Water Aquarium*, by Otto Eggeling and F. Ehrenberg.

Simple Experiments on the Growth of Moulds

Set up the following :

1. Dry bread in daylight, dry bread in dark.
2. Damp bread in daylight, damp bread in dark.
3. Stewed prunes in daylight, stewed prunes in dark.

Each should be placed in a saucer and covered with a tumbler carefully labelled and dated. Within a week or so it will be found that moulds have developed on the damp bread and probably on the prunes (though it may be a little longer before it develops on the prunes), and usually little or none develops on the dry bread. It will also be found that on those in the dark, growth has taken place more rapidly and freely than on those in the daylight.

If, also, similar sets of bread and prunes are placed in similar positions, but are not covered over by a tumbler, it will be found that the moulds grow less freely, if at all, in the same given time.

From a very simple series of observations such as this, it is gathered that darkness and dampness and stagnant air foster the growth of moulds. Probably, also, a good deal of bacterial growth, indicated by yellow and brownish and sometimes by red colouration of the

bread, will be found to have taken place particularly on the damp bread in the dark.

A further series of observations may be made. Two test tubes containing a small slip of dry bread, two containing damp bread, and two containing prunes, should each be plugged with cotton-wool, placed in a rack or beaker, and sterilised by exposing to steam from boiling water (this can be very conveniently done in an ordinary potato steamer) for half an hour or more. Each test tube should be labelled and, after sterilisation and cooling, one of each type should have the plug removed, and be exposed to air for a quarter of an hour or so, and then replugged, the others left unexposed to air. These test tubes should be kept under observation for several weeks.

In which do the moulds develop, and what conclusion can be drawn from this ?

Something of the life-history of the Pin Mould (*Mucor mucedo*) may be conveyed in very simple language to young children of twelve or so, and more fully, aided by microscopical examination, to older pupils. The plant not possessing the green colour found in all ordinary plants has to live differently from them. The green part of a plant helps it to take food from the air (carbon dioxide made into starch through the agency of chlorophyll grains). Now, as these moulds cannot make food from the air, not having any leaf-green, they have to get it ready-made. So they live and grow on things like bread, fruit, jelly, damp wood, and so on, or some of them live in and on other living plants. They are very simple plants, with no leaves or stem or roots. Each plant just consists of a fine white thread which branches very freely.

In this thread is the living substance (protoplasm) of the plant.

Some of the threads will be seen to raise themselves up in the air. The end of this raised thread swells, making a round knob. Into this, the living substance gathers and fills the knob. Then it breaks up into tiny grains (spores) and the knob bursts, liberating the tiny grains. Each spore is really a baby mould, and falling on to some bread or fruit, or something else suitable to it, can grow and make a new mould plant. There is another way in which the baby mould plants may be made. The ends of two of the white threads may come together; the living substance gathers in each end. Then the two ends join, and the two masses of living substance join, and form a single ball of protoplasm. This also is a baby mould, and it can grow into a new mould plant.

Germination of Healthy and of Diseased Seeds

Soak two lots of seeds (*e.g.* peas, beans, wheat) in water, one lot for about twenty hours, the other for a few days, till they have become covered with bacterial slime.

Plant the two sets of seeds in separate pots, pans, or boxes, in the same medium (*e.g.* soil, sphagnum moss, sand). Keep moistened. Watch development.

The healthy seeds grow up into strong plants. The diseased ones grow very little, if at all.

LIST OF UNISEXUAL FLOWERS

Terms

Catkin . . . Group of stalkless unisexual flowers (*i.e.* either all ♂ or all ♀).
♂ . . . Male.
♀ . . . Female.
Dicœcious . . Male and female flowers on separate plants.
Moncœcious . . Male and female flowers on the same plant.

Name.	Kind.	Description.	Month of Flowering.	Remarks.
Hazel . .	Shrub	Moncœcious	Feb. to April	♂ pendulous catkins; ♀ green buds with red stigmas protruding.
Willow . .	Tree	Dicœcious	March to May	♂ silky catkins, yellow stamens; ♀ silky greyish-green pistils; pollinated by bees, nectar at base of catkin scales. Many varieties of willows.
Oak . . .	,,	Moncœcious	April to May	♂ pendulous loose catkins; ♀ green bud with red stigmas protruding.
Dog's Mercury .	Herb	Dicœcious	Feb. to May	Grows in woods and hedge banks, flowers inconspicuous, ♂ yellowish stamens; ♀ green pistils.
Annual Mercury	,,	,,	July to Nov.	Found in and near cultivated ground as a weed, stem branched, leaves smooth, but on the whole resembles Dog's Mercury.
Alder . .	Tree	Moncœcious	March to April	By streams and in damp places, ♂ catkins pendulous yellow stamens, dull red scales; ♀ catkins small of dark green scales with tiny red stigmas protruding; form a small cone-like fruit.

Birch	,,	,,	March to April	♀ and ♂ catkins dark green.
Sweet Chestnut	,,	,,	April to May	Fruit enclosed in prickly cup.
Poplar	,,	Dicœcious	March to May	Several varieties.
Beech	,,	Moncœcious	April to May	
Box	Shrub	,,	April to June	Small flowers in axillary clusters of many staminate flowers surrounding a terminal pistillate flower.
Stinging Nettle	Herb	Dicœcious	June to Sept.	Inconspicuous flowers in pendulous racemes.
Red Campion	,,	,,	May to August	Large pink flowers, stamens and stigmas prominent.
White Campion	,,	,,	June to Sept.	Large white flowers.
Wild Arum ('Lords and Ladies,' 'Cuckoo-Pint')	,,	Moncœcious	May to June.	Small unisexual flowers grouped round a thickened 'spadix' (stalk) and enclosed in a large sheathing green bract, very similar to White Arum; pollination effected in an interesting way by very small flies.
Vallisneria (Tape-weed)	Water plant	Dicœcious	June	Found in cooling-ponds at waterworks, in conservatory water-basins, etc., may be purchased at naturalists', and kept in aquarium; grass-like leaves. ♀ plants have broader, darker leaves than ♂, and have their root fibres arising from a bulb-like swollen underground stem, while the fibres of ♂ plant arise from a somewhat elongated stem. ♂ and ♀ flower-buds (green) formed under water; ♀ flower carried up to surface by long spiral flower-stalk; ♂ flower breaks off and rises to the surface, there drifts towards ♀, stamens and stigma come into contact, and so pollination effected; fruit set in mud at the bottom of the tank by contraction of the spiral flower-stalk.
Hop	Herb		July to Sept.	Climber found wild in hedges, flowers greenish yellow.

Fertilisation in Seaweeds

Most of the olive-brown seaweeds mature in the autumn and early winter, though the time of maturity fluctuates somewhat according to the weather. From October onwards, one may be fairly sure of obtaining some of the olive-browns in a mature condition. They travel quite well, being useful for several days after dispatch.

To see the process of fertilisation, hang up the plants in the air for a short time. Out of some conceptacles (*i.e.* the minute cup-like depressions from which fine hairs project, and which are aggregated at the ends of some of the branches, causing the ends to be thickened, in some cases greatly swollen) an orange slime is seen to exude. This contains the spermatozoa. From others perhaps on the same plant, perhaps on another plant of the same species, a greenish slime exudes. This contains the oospheres, which are recognisable with a hand-lens. Each may be examined microscopically separately, in a drop of sea-water (failing this, fresh water in which a seaweed plant has been rinsed, will do). The small motile sperm, consisting of a nucleus and two protoplasmic cilia, bears great contrast to the large, passive, non-ciliate ovum, rich in protoplasmic nutrient material.

Then in a drop of water some of the green slime (ova) and some of the orange slime (sperms) may be mixed, and the process of fertilisation seen to take place. Numerous sperms bombard each ovum till the entrance of one is effected. The ovum then comes to rest, and very quickly begins to germinate.

Name.	Description.	Remarks.
Fucus vesiculosus (Bladder Wrack)	Perennial	♂ and ♀ conceptacles on different plants usually, but sometimes on the same.
F. serratus (Toothed Wrack)	,,	♂ and ♀ on different plants usually.
F. nodosus (Knotted Wrack)	,,	♂ and ♀ on different plants usually.
F. canaliculatus	,,	♂ and ♀ on different plants usually.
F. platycarpus	,,	♂ and ♀ on same plant and in same conceptacle, usually found highest on the shore (*i.e.* near to high-water mark).

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In this short list of books—by no means exhaustive—will be found many which should be of service to the general reader who desires to follow up some of the questions raised in connection with these matters concerning the education and training of children. It is somewhat difficult to classify the literature as, in many cases, the bearings of one work may be valuable in several directions; but an attempt is made to place each work in the category appropriate to its main trend. The books named should, for the most part, be helpful to the general reader; no attempt is made to include the more purely scientific and advanced works bearing upon the subjects treated in the text. Those works marked * are, however, of a more technical and advanced nature than those unmarked.

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